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J. F. DASHIELL, PH. D., CONSULTING EDITOR

PSYCHOLOGY IN HUMAN AFFAIRS

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erned by continued postwar shortages.*

McGraw-Hill Publications in Psychology

J. F. DASHIELL

CONSULTING EDITOR

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PREFACE

A number of trends in psychology have prompted the writing of this book. First, psychology is becoming more and more *factual*. Both students and teachers are interested in facts rather than in theories, in data rather than in "isms" and speculation. Second, psychology is becoming more *practical*, more useful and applied. It is no longer a mere academic subject; it can be used in fighting wars, in selling merchandise, in hiring men, in educating children, in reducing crime. Third, psychology is becoming more *inclusive*. It is increasing in breadth and scope. It is a significant factor in almost every field of human endeavor. Wherever man is, there psychology can appropriately function.

Consequently, the emphasis throughout this book has been on the factual, practical, and varied phases of psychology. The attempt has been to report typical facts about how psychology has been used in more than twenty fields or areas. Sometimes, because of limited space, these facts are reported with a minimum of interpretation. Without guidance they may be confusing to the beginning student. However, this is a classroom textbook and is not intended for the self-educated student or the casual reader of psychological literature. This book needs a teacher to interpret facts and answer questions. The traditional classroom lecture (facetiously designated by one student as "a procedure of transferring ideas from the professor's notebook to the student's notebook without passing through the heads of either") can be eliminated when this book is used as a text. Adequate factual material to give the student a bird's-eye view of the various applications of psychology is included in the following pages. The teaching problem is to explain what this material means.

This book is intended primarily for the beginning student, although it is appropriate for any survey course in applied psychology. Another trend in psychology seems to be, and with apparent justification, to devote the first half (or semester) of the beginning course to introductory material and the second half to a survey of the applications of psychology. This book is designed for the second semester of such a course.

The book was planned and much of it written by the author whose name appears on the title page. However, certain chapters were assigned to others who have had extensive experience in the use of psychology in their respective fields. Chapter VII was written by Mrs. Wheeler who teaches abnormal psychology; Chapter VIII was written by Dr. Brown, also a teacher of abnormal psychology; Chapter X was written by Dr. Stagner, a recognized authority on the psychology of public opinion and propaganda; Chapter XI was written by Dr. Rogers who teaches courses in criminology; Chapter XII was written by Dr. Berglund-Gray, a former teacher of music; Chapters XIII and XIV were written by Mr. Seashore who is constantly dealing with personnel problems in business and industry; Chapter XV was written by Dr. Dietze who taught a course—"Work and Efficiency"—in the Army Personnel Training Program; Chapter XVI was written by Miss Blosser, formerly a graduate assistant to the senior author; Chapter XVII was written by Captain Fahey and Lieutenant Mintz, former Army classification and counseling specialists; and Chapter XVIII was written by Dr. Whitmer, formerly Director of the Psychological Clinic at the University of Pittsburgh. The excellence of all these chapters is obvious and is hereby recognized by the senior author.

Acknowledgment is made of the special assistance of two of the coauthors—Dr. Berglund-Gray, who assisted in editing the contributed chapters; and Miss Blosser, who typed manuscript, checked tables and graphs, and assisted in library research. The author is grateful to Dr. Dashiell, the consulting editor of this series of publications, who made many excellent suggestions which were duly incorporated.

J. STANLEY GRAY.

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PSYCHOLOGY IN HUMAN AFFAIRS

CHAPTER I

INTRODUCTION

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Psychology in human affairs has had a long and turbulent history. It began as mysticism, then became philosophy, and is now becoming science. Unfortunately, psychology has retained many characteristics of its former stages of development. Mystical concepts are still found in much of the literature, and philosophical speculation is still substituted for scientific research. However, psychological "isms" are definitely on the decline. Mooted problems have been taken to the laboratory and investigated under controlled conditions. As the accumulation of factual material has increased, armchair speculation has decreased. The concepts of mysticism and the carefully reasoned "isms" of philosophy are gradually being supplanted by the tabulated facts of scientific research.

The following pages in this chapter review some of the steps psychology has taken in its slow rise from mysticism. The chapters that follow indicate something of the present status of psychology and suggest some uses that are being made of it.

PSYCHOLOGY IN THE PRESCIENTIFIC ERA

Man developed methods of recording his progress long before he developed a science of psychology. Consequently, we have a long era

of prescientific psychology that has been recorded in considerable detail. The following pages briefly review a small segment of this extensive literature. Just those psychologies are reviewed that, though primitive and fallacious, are still active. Evidence of the fallacies inherent in them is also presented.

ASTROLOGY

It was recently reported that when a London newspaper omitted its daily horoscope, there were 50,000 protests by personal call, telephone, and telegraph. A California astrologer announced over the radio that he would read the horoscope of anyone who would accompany his request with \$4. He is reported to have received 30,000 replies. Evangeline Adams, who would not answer a single question for less than \$100, counted among her clients such dignitaries as James J. Hill, the empire builder; J. P. Morgan, the financier; John Burroughs, the naturalist; Caruso, the opera singer; Richard Harding Davis, the writer; and William Jennings Bryan, the politician. She was supposed to have accurately predicted the advent of the First World War, the sex of a New England Hereford calf, the panic of 1907, and the death of the wife of a Southern gentleman. She gave advice on every known problem that concerned human affairs, for which she charged fees that rival those of a corporation lawyer.

Astrology began in Babylonia and spread to Greece about the middle of the fourth century. It gradually diminished with the development of science, although in recent years it has regained much of its popularity. Francis Bacon harshly condemned it, and others more recently have subjected it to scientific investigation.

Astrology is a theory that human affairs are controlled by the heavenly bodies. From a study of the stars and their influence, the astrologer believes that human affairs can be predicted. Even the date of birth is supposed to have great influence on one's life because destiny is presumably determined by the zodiac sign under which one is born. What one is to become and the events that occur in his life can be predicted from a study of the zodiac.

In evaluating astrology, it should be noted that astronomers, those scientists who have carefully studied heavenly bodies and know more about the universe of stars and planets than any other group of specialists, agree there is no evidence to support the claims of astrology. If the stars influence human destiny, that influence is so meager that it escapes scientific discovery. Even if there were astral influences, they would change over a period of years because the zodiac

is not fixed. True, it changes slowly but fast enough to make the astrological beliefs of the ancients now out-of-date. (A zodiac circuit occurs every 25,800 years.)

Furthermore, astrologers do not agree among themselves. What signs influence what? How can conflicting opinions about these influences be settled? Astrology has neither subject matter nor methodology. Consequently, it can never become a science and disagreement is inevitable:

A few years ago, Parr¹ had one of his graduate students, an army officer, write to 16 astrologers, located in our own and foreign countries, for horoscope readings. They gave him a total of 60 personality traits, only seven of which were objectionable. Every day in the year was designated as both lucky and unlucky for him by at least one astrologer. Some of them advised him to stay on his present job and some advised him to look for another. Some said that he would soon take a long trip and others said that he would not. Parr concludes that "results of this analysis revealed not only unfulfilled, unrealized, and mistaken predictions but also demonstrated a wide disagreement among astrologers over identical vocational issues."

If the zodiac signs do influence our destinies, a study of the birth dates of eminent men should substantiate this claim. We could expect to find that most great scientists were born under one sign, most great statesmen under another, most great musicians under another, etc. With this in mind, Farnsworth² studied the relation of musical and artistic ability to the month of birth, or to the zodiac sign under which eminent musicians and artists are born. He secured his data on the time of birth from three sources—*Musical Who's Who*, by Key; *A Dictionary of Music and Musicians*, by Grove; and the *Cyclopedia of Painters and Paintings*. One would suppose that if the time of birth makes enough difference to enable astrologers to predict the future development of ability, this evidence would become obvious in Farnsworth's study. However, the data showed that the birth dates of neither musicians nor artists are concentrated under any sign, and certainly not under Libra nor Taurus as claimed by most astrologers. Farnsworth then took the birth dates of the population of New York City and those of all babies born in Vienna for the years 1925 to 1934, to see if and how the musicians and artists differed in the distribution of their birth dates with these typical populations. All these data are

¹ Parr, F. W., *How's Your Horoscope? Occupations*, 1937, 16, 236-238.

² Farnsworth, P. R., *Aesthetic Behavior and Astrology, Character & Pers.*, 1938, 6, 335-340.

shown in Table 1, from which the conclusion is obvious that the time of birth has nothing to do with the development of musical and artistic abilities.

TABLE 1.—PERCENTAGE OF CERTAIN SELECTED GROUPS BORN UNDER EACH ZODIAC SIGN

Zodiac sign	Musicians		Painters	Citizens of	
	Who's Who (N 1,998)	Diction-ary (N 3,257)	Cyclo-pedia (N 2,478)	New York City	Vienna
Aries.. . . .	9.2	9.6	8.8	8.3	9.0
Taurus	8.2	7.7	9.5	8.1	8.9
Gemini.	7.9	8.2	8.2	8.5	8.9
Cancer.	8.6	7.5	7.6	8.5	8.8
Leo....	8.1	7.5	7.7	8.4	8.0
Virgo...	8.3	7.4	8.8	8.3	7.7
Libra.	7.2	7.7	8.9	8.1	7.7
Scorpio.	7.2	7.9	6.9	8.0	7.4
Sagittarius	8.1	8.2	7.0	8.1	7.5
Capricorn	9.0	8.9	8.5	8.5	7.8
Aquarius	9.0	9.8	8.6	8.5	8.9
Pisces	8.3	9.8	9.6	8.6	9.3

TABLE 2.—AVERAGE PERCENTILE RANK ON INTELLIGENCE TEST OF COLLEGE FRESHMEN BORN IN RESPECTIVE MONTHS
(N 2,327)

Month of Birth	Percentile Rank on I Q. Test
January...	48.6
February...	49.9
March	49.5
April	47.3
May	50.6
June...	51.8
July	50.6
August	48.1
September	52.8
October.. . . .	49.2
November	50.3
December	50.6

Pintner¹ studied the relation between intelligence and the month of birth of 4,925 New York City school children. (According to astrologers, a majority of intelligent people are born in the month of

¹ Pintner, R., Intelligence and the Month of Birth, *J. Appl. Psychol.*, 1931, **15**, 149-154.

September.) He found that the month of birth has no influence on intelligence. Held¹ conducted a similar study with college freshmen. He found that the average intelligence of students was about the same regardless of the month of birth. His results are shown in Table 2. If zodiac signs were important, we could expect that the intelligence of those students born in September would be significantly higher than of those born in other months under other signs.

The interpretation of these studies is clear. The month of a person's birth has no significance at all in his later life. Neither his ability nor his luck is dependent on the month of his birth. The astrologers are wrong in their assumptions and are not justified in making any predictions at all. Astrology is a hoax from which the uninformed should be protected. Certainly it has no scientific justification.

PHRENOLOGY

51. Late in the eighteenth century, Franz Joseph Gall wrote a six-volume treatise on cranioscopy, or phrenology. His theory was that man has mental faculties that differ in magnitude or power. He believed that these are located in separate parts of the brain. Then he reasoned that the size of the faculty is correlated with the size of its brain area. If the faculty is large, the brain area will be large and, so Gall believed, will cause the skull to protrude at that place. Then by a study of the protrusions or bumps on the cranium it is possible to predict the size of the mental faculties. For example, if a person's skull protruded immediately above the ears, he was supposed to possess the faculty or trait of destructiveness, since this is the location of that trait. Other traits, 26 in all, were supposed to be located in other specific areas of the brain. Gall even published a map of the brain and showed the location of such traits as cautiousness, imitation, benevolence, self-esteem, parental love, friendship, etc.

Two of Gall's students, Spurzheim and Combe, carried his doctrines to England and America. Phrenology societies were established and journals were published. The theory, or assumption, of the doctrine was soon forgotten and phrenologists diagnosed mental qualities with authoritative dogmatism. Phrenology became a racket.

Evidence to support the extravagant claim of phrenology has never been discovered. On the contrary, investigations soon piled up evidence on the other side. First, it was proved that there is no relation between brain size and intelligence. Some brilliant men have had

¹ Held, O. C. Influence of the Month of Birth on the Intelligence of College Freshmen, *J. Genet. Psychol.*, 1940, **57**, 211-217.

large brains, and some have had small brains. Thackeray's brain weighed 1,658 g. Daniel Webster's weighed 1,518 g. On the other hand, the brain of Anatole France weighed but 1,017 g. It was found that, while the average human male brain weighs 1,440 g. and the average human female brain weighs 1,360 g., there is no evident difference in intelligence. Certainly brain size is no indication of intelligence.¹

Second, the shape of the cranium is known to be determined by factors other than the shape of the brain inside. The use of instruments at time of birth often leaves permanent effects on the shape of the cranium. The habitual position in which the infant sleeps during the first years of life often determines the shape of his skull. Furthermore, it is known that the skull is not of uniform thickness. A protrusion may indicate a thick place in the skull and not a development of the brain inside. The shape of the skull is in no way determined by the size or development of mental traits.

TABLE 3.—BRAIN-AREA FUNCTIONS AND PHRENOLOGY CLAIMS

Brain areas	Actual function	Phrenology claim
<i>a</i>	Hearing	Destructiveness
<i>b</i>	Vision	Parental love
<i>c</i>	Control of feet and legs	Spirituality
<i>d</i>	Control of arms and hands	Ideality
<i>e</i>	Control of head and face	Constructiveness
<i>f</i>	Body sensations	Cautiousness
<i>g</i>	Speech	Acquisitiveness

Third, it is now denied that mental faculties exist as distinct and recognizable classifications of mental life at all. Memory, for example, is not a discrete trait but a phase of behavior that is superior for some things, average for others, and inferior for still others. No reputable psychologist today believes that the mind is made up of discrete faculties. Instead, mental life is a unitary function of the entire individual in relation to his environment and is difficult to distinguish even from physical behavior. Destructiveness, for example, is not a mental faculty but the way some individuals react to some situations. It is characteristic of that individual only *in that situation*. It is not characteristic of the individual any more than it is characteristic of the

¹ Of course, abnormally large brains (macrocephalics) and abnormally small brains (microcephalics) are both indicative of limited intelligence.

situation, because in other situations he does not react in a destructive manner.

Fourth, recent laboratory studies have shown that the various areas of the brain have functions entirely different from those postulated by the phrenologist. For example, it is known that the area just above the ears is the center for hearing and not for destructiveness. The real functions of certain brain areas and the functions claimed by the phrenologists are shown in Table 3.

The claims of the phrenologists have not been substantiated by experimental results. No studies of brain function afford the slightest evidence for believing the theory that cranial bumps indicate mental traits of any sort. Like astrology, phrenology must be discarded as unscientific and unworthy of serious attention.

GRAPHOLOGY

In 1662, Baldo published in Italy a treatise on the method of analyzing a man's character from his handwriting. This was called "graphology." The theory is that character can be judged from characteristics of handwriting. Somehow, a person's character is supposed to be reflected in his handwriting. Katherine Blackford incorporated graphology in her system of character analysis. She thus popularized it among a large and influential clientele. The more basic writing traits and the character traits they are supposed to indicate are shown in Table 4.

TABLE 4.—HANDWRITING TRAITS AND THE CHARACTER TRAITS THEY ARE SUPPOSED TO INDICATE

Handwriting traits	Character traits
Upward sloping lines.....	Ambition, pride
Heavy lines and heavy bars over t's. . . .	Forcefulness
Fine lines	Bashfulness, timidity
Writing too slanted	Slowness, sluggishness
Closed a's, o's and d's.	Reserve, caution
Open a's, o's, and d's	Dishonesty
Long bars over t's.	Perseverance

The validity of handwriting as a means of judging character has been carefully studied. Hull¹ and Montgomery¹ analyzed the handwriting of 17 fraternity brothers who rated each other on the possession of certain character traits. The handwriting was found to possess but little indication of the presence of these traits. The highest rela-

¹ Hull, C. L., and Montgomery, R. B., An Experimental Investigation of Certain Alleged Relations Between Character and Handwriting, *Psychol. Rev.*, 1919, 26, 63-75.

tionship was between bashfulness and the lateral narrowness of m's and n's, and this was but 7 per cent better than chance. The results of this study are shown in Table 5.

TABLE 5.—CORRELATIONS OF CHARACTER WITH HANDWRITING

Character traits	Handwriting traits	r^*
Ambition	Upward sloping lines	— 20
Pride	Upward sloping lines	— 07
Bashfulness	Fineness of lines	— 45
Bashfulness	Lateral narrowness of m and n	38
Force . . .	Heavy lines	— 17
Force	Heavy bars over t's	— 06
Perseverance	Length of bars over t's	00
Reserve	Closed a's and o's	— 02

* The coefficient of correlation is usually designated by r . It is a measure of relationship, either positive or negative. It extends from +1.00, a perfect positive relationship, to zero (.00), a complete absence of relationship to -1.00, a perfect inverse relationship. Relationships, either positive or negative, are always better than chance. A perfect relationship is 100 per cent better than chance. No relationship (a zero correlation) is pure chance. Varied degrees of relationship are indicated by coefficients of correlations less than 1.00. An r of .50 indicates a relationship that is 13 per cent better than chance; one of .80 is 40 per cent better than chance; one of .95 is 68.78 per cent better than chance; and of course an r of 1.00 is 100 per cent better than chance.

Brown, as reported by Viteles¹, followed essentially the same procedure as Hull and Montgomery and found essentially the same low correlations. These results are shown in Table 6.

TABLE 6.—RELATION BETWEEN CHARACTER TRAITS AND HANDWRITING TRAITS

Character traits	Handwriting traits	r
Bashfulness	Width of down strokes	11
Ambition	Upward slope of line	23
Persistence	Width of down stroke	— 05
Persistence	Breaks of line within words	— 03
Personal neatness	Neatness in writing	23
Personal individuality	Individuality in writing	15

Middleman² studied the ability of college students to judge intelligence and age from handwriting. He found a mere chance relationship in the judgment of intelligence from handwriting, and a correlation of but .25 in the judgment of age from handwriting.

¹ Viteles, M. S., *Industrial Psychology*, p. 199, W. W. Norton & Company, Inc., New York, 1932.

² Middleman, W. C., The Ability of Untrained Subjects to Judge Intelligence and Age from Handwriting Samples, *J Appl Psychol.*, 1941, **25**, 331-340.

Consequently, we must conclude that as far as present knowledge goes, a person's character traits are not revealed in his handwriting. Graphology must also be classified as an unscientific method of personality diagnosis.

PHYSIOGNOMY

Physiognomy is a theory that the physical characteristics of the face and body indicate character and temperament traits. Who has not heard that "red-headed people are hot-tempered," or "fat people are good-natured," or "long fingers indicate artistic ability"? The high forehead, the receding jaw, the short neck, the triangular face, the skin pigmentation, the size of the bones and joints, the texture of the hair, etc.—all have special significance for the physiognomist in character analysis. Personality traits are supposed to be determined by bodily characteristics.

The theory of physiognomy extends back to Galen (A.D. 200). He believed that the universe is composed of four elements—fire, air, water, and earth—which are represented in the body as four biles or humors. These, in turn, determined the temperament of the individual, depending on which one was dominant. Black-bile dominance was supposed to produce a melancholic and sad temperament. Yellow bile caused one to be irritable. Phlegm (bile) produced a dull and listless individual. Blood (bile) brought about vitality and friendliness. While Galen's theory antedates a lot of scientific progress, it is about as reasonable as some of the later modifications of it.

A more recent classification of body types, which has attracted wide attention, was by Kretschmer.¹ He observed (*sic*) that certain types of mentally abnormal patients seem to have certain types of body build. For example, he thought that the manic-depressive patients are usually heavy-set with short limbs, while the schizophrenia patients are more often thin and angular. Between these he placed an intermediate or more normal group. He called the first type "*pyknics*" and described them as having full faces, short necks and limbs, being overweight, extroverted, good natured, realistic, and relaxed. He called the opposite type "*asthenics*" or "*leptosomes*." These are slender, tall, sharp featured, introverted, humorless, and phlegmatic. The *pyknics* tend to range from a gay to a melancholic state, while the *leptosomes* tend to be "hypersensitive and dull." The in-between group, which Kretschmer called "*athletics*," are well built and mild-mannered. They are the "cool men of decision, inclined to consistency

¹ Kretschmer, E., *Physique and Character*, Harcourt, Brace & Co., Inc., New York, 1925.

of thought and general systemization." Kretschmer believed that most individuals fall into one of these three classifications, although he admitted that there are mixed types. This theory has been the subject for a voluminous literature, especially in the German language.

Perhaps the climax of the body-type theories of personality is that of Berman.¹ Because the malfunction of any one of the various endocrine glands will cause certain very characteristic abnormalities in body structure, or in body function, or in both, Berman jumped to the conclusion that at least one of the endocrine glands is malfunctioning in each individual and thus causing a characteristic personality type. "The endocrine type of an individual is . . . a prediction of his reactions in the future, much as a chemical formula outlines what we believe to be the skeleton of a compound substance." Since an endocrine may either overfunction or underfunction, the personality may be a positive type or negative type. One is usually the opposite of the other. In the following list of personality type characteristics (according to Berman), some are positive and some are negative.

1. The adrenal personality (positive, due to oversecretion)
 - Deeply pigmented skin
 - Thick, coarse, and dry hair
 - Tendency to tuberculosis, diphtheria, and influenza
 - Vigorous, energetic, and persistent
 - Tendency toward virilism
 - "Develops into a progressive winning fighter, who will arrive at the top in the long run every time"
2. The pituitary personality (positive, due to oversecretion)
 - Large, spare body frame
 - Eyes wide apart
 - Broad face
 - Teeth large, broad, unspaced
 - Square, protruding chin and jaws
 - Large feet and hands
 - Early hair growth on body
 - Thick skin; large sex organs
 - Aggressive, precocious, calculating, self-contained.
3. The thyroid personality (negative, due to undersecretion)
 - Height below average
 - Tendency to obesity (toward middle age)
 - Complexion sallow
 - Hair dry—hairline high

¹ Berman, Louis, *The Glands Regulating Personality*, The Macmillan Company, New York, 1928.

- Eyebrows scanty, either as a whole or in outer half
- Eyeballs deepset, lackluster, in narrow slits
- Teeth irregular, become carious early
- Extremities cold and bluish
- Circulation poor; subject to chilblains
- 4. The thymocentric personality (positive, due to oversecretion)
 - Slender waist, gracefully formed body, rounded limbs, long chest, feminine pelvis
 - Skin smooth and velvety
 - Little or no hair on face
 - Often double-jointed, flatfooted, knock-kneed
 - Small heart and fragile blood vessels
 - Tendency to homosexuality
 - Poor resistance to infections and disease
 - Emotionally unstable
- 5. The gonadcentric personality (negative, due to undersecretion)
 - Incomplete, irregular, or absent hair development
 - Skin yellowish, leathery, wrinkled
 - Voice high pitched
 - Tall and slender; muscles flabby
 - Feet and hands small
 - Straightforward homosexuality
- 6. The parathyroid centered personality (negative, due to undersecretion)
 - Often premature birth
 - Hypersensitive, especially affecting visceral organs
 - Tendency to hysteria
 - Poor teeth
 - Body small, health puny
 - Tendency to eidetic imagery
 - Restless, eternally unsatisfied, and fastidious
 - Temporal arteries become hardened early

So much for the various theories as to which personality traits are associated with which bodily traits. Let us now turn to the scientific evidence for any sort of physiognomy theory. When submitted to careful investigation, all theories of the relation of bodily characteristics to personality or character traits are in error. Personality traits are habits that are learned. Any sort of a body type may learn any sort of a personality trait. Such traits are learned from birth on and are characteristic of the social conditions under which the child is reared. Personality is a product, within hereditary limitations, of environmental controls. "Tell me the street a man was reared on and I will tell you more of his personality traits than any physiognomist can tell by the careful measurements of his body dimensions."

Paterson and Ludgate¹ studied the scientific justification of Blackford's claim that there are characteristic differences between blonds and brunets in character traits. Their procedure was to have 94 "intelligent and educated adults" rate two blonds and two brunets of their own acquaintance on those character traits alleged by

TABLE 7.—PERCENTAGE OF 187 BLONDS AND 187 BRUNETS RATED AS POSSESSING EACH TRAIT

	Blonds	Brunets
Blond traits (Blackford):		
Positive	81	81
Dynamic	63	61
Driving	49	50
Aggressive	62	56
Impatient	56	51
Active	88	82
Quick	70	68
Hopeful	85	85
Speculative	53	51
Changeable	53	43
Variety-loving	66	62
Domineering	36	36
Brunet traits (Blackford):		
Negative	16	17
Static	28	31
Conservative	51	61
Imitative	39	40
Submissive	25	26
Cautious	54	60
Painstaking	56	61
Patient	43	52
Plodding	27	31
Slow	20	24
Deliberate	47	57
Serious	58	72
Thoughtful	67	70
Specializing	52	45

Blackford to distinguish blonds from brunets. The results were then summarized to see if the blonds possessed blond traits and if the brunets possessed brunet traits. The results are shown in Table 7. Obviously, complexion is not significant in the possession of character traits. The traits that Blackford claimed were characteristic only

¹ Paterson, D. G., and Ludgate, K. E., *Blonde and Brunette Traits: A Quantitative Study*, *J. Person. Res.*, 1922, 1, 122-127.

of blonds were actually just as characteristic of brunets. Those supposed to be brunet traits were found to an equal degree among the blonds.

Sheldon¹ made 12 physical measurements of 434 college freshmen and correlated the resulting morphological indexes with intelligence. He found a correlation of but .14. In another study² he correlated the morphological index of 155 freshmen with personality traits obtained from acquaintance ratings. These results are shown in Table 8. None of the relationships is significant.

TABLE 8.—CORRELATION OF MORPHOLOGICAL INDEX WITH PERSONALITY RATINGS

Traits	<i>r</i>
Emotional excitability	.00
Aggressiveness	-.08
Leadership	-.14
Sociability	-.22
Perseverance	.01

A similar study was conducted by Garrett and Kellogg.³ They obtained a morphological index for each student (male college freshmen) from three photographs in the nude taken by the department of physical education. They then administered the Thorndike Intelligence Test, the George Washington Social Intelligence Test, and the Woodworth Personal Data Sheet (for emotional stability). They also measured the height and weighed each student to obtain a height-weight ratio. The correlations between these various factors are shown in Table 9.

TABLE 9.—RELATION OF PERSONALITY TRAITS WITH MORPHOLOGICAL INDEX AND HEIGHT-WEIGHT RATIO

Trait	Morphological index		Height-weight ratio	
	<i>N</i>	<i>r</i>	<i>N</i>	<i>r</i>
General intelligence	219	.07	219	.10
Social intelligence	151	.05	150	.09
Emotional stability	123	-.06	122	.05

¹ Sheldon, W. H., *Morphologic Types and Mental Ability*, *J. Person. Res.*, 1927, 5, 447-451.

² Sheldon W. H., *Social Traits and Morphological Types*, *J. Person. Res.*, 1927, 6, 47-55.

³ Garrett, H. E., and Kellogg, W. N., *The Relation of Physical Constitution to General Intelligence, Social Intelligence, and Emotional Stability*, *J. Exp. Psychol.*, 1928, 11, 113-129.

Another study of the validity of physiognomy as a method of character analysis was made by Ford.¹ He had character readings made of 18 university students by representatives of a firm of physiognomists, operating under the trade name of "Vitosophy." These readings were then correlated with university grades, psychological tests, and the student's self-estimates. To compare the results with chance, he also made character readings by a lottery procedure. The results are shown in Table 10. Note that all correlations are low and

TABLE 10.—CORRELATIONS BETWEEN MEASURES OF ABILITY AND VITOSOPHY SCORES AND LOTTERY SCORES

	Vitosophy	Lottery
Mathematics grades	-.16	-.24
Written English grades . . . . .	.32	-.10
Science grades . . . . .	.10	.15
Scholarship (all grades) . . . . .	.23	-.38
Intelligence (Army Alpha)	-.21	.24
Mechanical ability (self-estimate)	-.55	.16
Musical ability (self-estimate)	-.31	.07
Average	-.08	-.01

the Vitosophy method is no better than the lottery method (pure chance).

A very extensive study of the validity of physiognomy was made by Cleeton and Knight.² They made 28 careful physical measurements of a group of college fraternity and sorority students to see if any physical characteristic is correlated with any character trait. The degree of the possession of a character trait was determined by the judgment of both close and casual acquaintances. Needless to say, no physical measurement was significantly correlated with any character trait. The average of all correlations was exactly zero. The average of the correlations of physical measurements with eight character traits is shown in Table 11. Note that all the correlations indicate but slight variations from chance.

Consequently, it would seem that the claims of physiognomy are no more justified than those of astrology, graphology, and phrenology. It is another psychological "gold brick." It constitutes a part of the psychological underworld. Character analysis on the basis of physical characteristics is no better than lottery.

¹ Ford, A., A Check on Character Analysis, *Person. J.*, 1930, 9, 121-123.

² Cleeton, G. U., and Knight, F. B., Validity of Character Judgment Based on External Criteria, *J. Appl. Psychol.*, 1924, 8, 215-231.

TABLE 11.—AVERAGE CORRELATIONS BETWEEN PHYSICAL MEASUREMENTS AND CHARACTER TRAITS AS JUDGED BY CLOSE ASSOCIATES AND CASUAL OBSERVERS

Trait	<i>r</i> for close associates	<i>r</i> for casual observers
Judgment...	-.005	.145
Intelligence...	.027	.051
Frankness.....	.055	.155
Will power...	.074	.036
Friendliness	.110	.195
Leadership...	-.041	.066
Originality...	.095	.079
Impulsiveness	.100	-.067

PSYCHOLOGICAL STEPS TOWARD SCIENCE

While the preceding pages review a fragment of that prescientific psychology which still has a considerable following, the following pages will review some of the steps psychology has taken toward becoming a science. Again, only a few highlights that now seem to be significant will be mentioned. Psychology's struggle from mysticism to its present approach to science has been slow and long. To review it in detail would take a book in itself.¹ The following high spots are suggestive, however, of some of the difficulties encountered, the techniques developed, the information obtained, and the progress yet to be accomplished.

STUDIES IN PSYCHOPHYSICS

Early in the last century (about 1829) Ernst Weber, professor of comparative anatomy in the Medical School of the University of Leipzig (Germany), performed a series of experiments to discover the relation of stimulation (physical) to sensation (psychical). These culminated in the discovery of Weber's law, which stated that the increase of stimulation necessary to be sensed as such is not absolute, but proportionate to the stimulation already present. For example, if a weight of 10 lb. is already being lifted, the addition of an ounce will not be sensed. But if only 10 oz. is now being lifted, the addition of an ounce can be sensed. Weber found that for a given sense, the proportionate increase in stimulation necessary to be sensed as an increase is a constant fraction of the stimulation already present. This fraction for the judgment of weight (the kinesthetic sense) is $\frac{1}{50}$. In

¹ See Boring, E. G., *History of Experimental Psychology*, D. Appleton-Century Company, Inc., New York, 1929.

other words, to be sensed as an increase, the present stimulation must be increased by $\frac{1}{30}$. If 10 lb. is being lifted, $5\frac{1}{3}$ oz. ($\frac{1}{30}$ of 10 lb.) must be added before an increase can be sensed as such. On the other hand, if only 10 oz. is being lifted, an increase of $\frac{1}{3}$ oz. ($\frac{1}{30}$ of 10 oz.) can be sensed. This constant fraction, or ratio, of the increase in stimulation to the stimulation already present, was designated as the "just noticeable difference" or the j.n.d.

This fraction, or ratio, or j.n.d., was found to be different for each sense. Weber found that the constant fraction for vision was approximately $\frac{1}{50}$. When a subject is asked to judge the difference in length of two lines, one line must be $\frac{1}{50}$ longer than the other before it is sensed as being longer. (This is true when they are presented simultaneously. If they are presented successively, the increase must be by at least $\frac{1}{20}$.)

Weber also began the experimental study of thresholds, or sensory limens. The lower threshold refers to the amount of stimulation necessary to arouse sensitivity at the lower limit. The upper threshold refers to the upper limit of sensitivity beyond which the addition of more stimulation will not be sensed. The differential threshold refers to the amount of stimulation necessary to enable one to distinguish one sensation from another. It is the j.n.d. For example, 18 vibrations per second is the lower threshold of pitch sensitivity; 25,000 vibrations per second is the upper threshold of pitch sensitivity. Vibrations above and below these thresholds cannot be heard by humans, although some of the lower animals can hear both higher and lower sounds than can man. The differential threshold is the number of vibrations between two tones recognized as different. People with absolute pitch can sense the difference in tones when the real difference is only a few vibrations. They have low differential thresholds.

Another experiment by Weber, which is now standard in any course in experimental psychology, was the "compass test." Its purpose was to discover how far apart two points must be on the skin to be recognized as separate. This was called the cutaneous two-point threshold. Weber found that different areas of the body differed in the two-point threshold. For example, in the middle of the back, two points of pressure a wide distance apart are still sensed as one point. The hands or the tongue are very sensitive in this respect. Two points do not need to be very far apart until they are sensed as two points. The two-point threshold is much less on the hands than on the back.

One of Weber's students was Theodore Fechner, who became interested in the relation of the sensed world to the physical world—

psychophysics. Fechner assumed that all j.n.d.'s were equal and therefore were the units of sensation. A large sensation was assumed to be composed of a certain number of j.n.d.'s. Therefore, he reformulated Weber's law as follows: When stimulation is increased by a constant ratio, the sensations aroused are increased by equal steps. Figure 1 illustrates this law in psychophysics. The increment in sensation is an arithmetical progression, while the increment in stimulation is a geometrical progression. In terms of mathematics, we

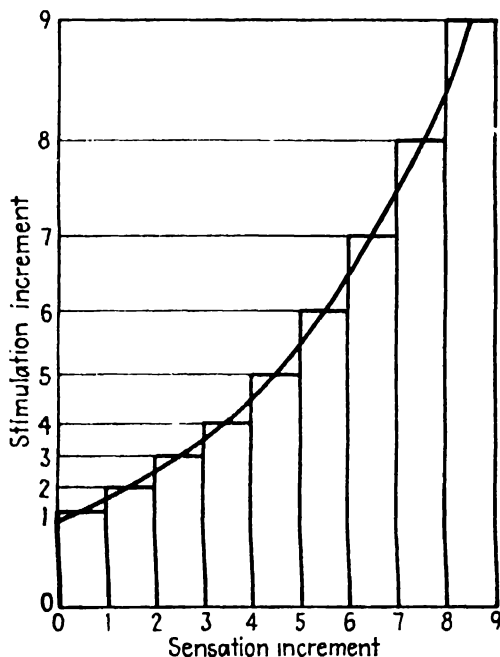


FIG. 1.—The relation of stimulation increase to sensation increase. (Constant fraction $\frac{1}{4}$.)

would say that stimulation is a logarithmic function of sensation. Table 12 shows the same data as Fig. 1 but stated differently. Fechner could now state Weber's law as follows: Sensations are in proportion to the logarithms of the stimulation.

The methods of research that were used in the study of psychophysics are worth our attention. Not only were Weber and Fechner very careful and objective in their work but they were pioneers. It is easier to modify and improve a method than it is to originate it. The three methods of research in psychophysics were not only good when considered in light of the time in which they originated, but they are good research methods even when compared with present-day stand-

ards. These were the method of minimal change, the method of constant stimuli, and the method of average error.

TABLE 12.—THE LOGARITHMIC RELATION OF STIMULATION TO SENSATION
(Constant fraction, $\frac{1}{4}$)

Sensation Increment	Stimulation Increment (lower threshold)
1	10
2	12.5
3	15.6
4	19.5
5	24.4
6	30.5
7	38.1
8	47.6
9	59.5

The Method of Minimal Change.—This is essentially the method of just noticeable differences by which Weber discovered the constant fraction. The procedure is to start with a given stimulus as a base (the standard stimulus) and then slowly increase it, or slowly decrease it, until the subject is able to notice a difference. Thus, the minimum change necessary for recognition is discovered. Sometimes, two stimuli are used—a fixed or standard stimulus and a changing stimulus. Whenever the changing stimulus is just barely recognized as different from the standard stimulus, a differential threshold, or a sensory unit (j.n.d.), or a constant fraction, is discovered. For example, suppose that subject *A* is able to recognize the difference in weight between 10 lb. and 10 lb. $5\frac{1}{3}$ oz., or between 10 lb. and 9 lb. $10\frac{2}{3}$ oz. However, he could not recognize differences in weight when they were less than $5\frac{1}{3}$ oz., either above or below 10 lb. We would then say that with 10 lb. as the standard stimulus, the j.n.d. was $5\frac{1}{3}$ oz. Then, suppose that we repeat the same procedure with 10 oz. as the standard stimulus. Here we find that the j.n.d. is $\frac{1}{3}$ oz. We then use 6 lb. as the standard stimulus and find the j.n.d. to be 3.53 oz. In each case, we compute the ratio of the j.n.d. to the standard stimulus and find that it is 1:30, or expressed as a fraction is $\frac{1}{30}$.

It is important in the method of minimal change that the changing stimulus be both increased from equality with the standard stimulus and decreased to equality with the standard stimulus. Results from the two approaches are not identical. Sometimes it is easier to tell when a different stimulus becomes equal to a standard, than it is to tell when an equal stimulus becomes different from a standard. Both approaches are necessary to find the true j.n.d.

The Method of Constant Stimuli.—With this method, fixed stimuli, rather than gradually increasing and decreasing stimuli, are used. The subject judges over and over again whether a stimulus is more than, less than, or the same as, a standard stimulus. For example, a subject may judge that a weight of 10 lb. 5 oz. is the same as a standard stimulus of 10 lb. in 80 per cent of his judgments and as more than the standard stimulus in the remaining 20 per cent. On the other hand, a weight of 10 lb. 6 oz. may be judged to be more than the standard weight of 10 lb. in 95 per cent of his judgments. A weight of 10 lb. 5½ oz. may be judged to be heavier than the standard weight in 50 per cent of his judgments and the same as the standard weight in the remaining 50 per cent of his judgments. This latter weight, then, is said to be the upper threshold of that j.n.d. Whatever weight is found to be judged as less than the standard in 50 per cent of the judgments is said to be the lower threshold. The percentages used vary, of course, with the experimenter. Sometimes 75 per cent of accurate judgments is used instead of 50 per cent. Often a threshold is designated as "the 75 per cent threshold," or "the 50 per cent threshold."

The Method of Average Error.—The procedure of this method is to establish a fixed or standard stimulus and then provide the subject with a variable one which he can adjust to equal the standard stimulus. His error is then recorded and the procedure repeated. For example, suppose that we ask a subject to pour enough water in a bucket to make its weight equal to a 10 lb. standard weight. We then actually weigh the bucket to find his error. A record of his errors for a hundred trials would provide us with an average error. This method is quite like the method of minimal change except that the subject regulates the changes himself.

The relative value of these three methods of research in psychophysics depends on the sensitivity that is being studied. The method of constant stimuli is most often used to measure tactual and kinaesthetic sensitivity. The method of minimal change seems to be best adapted for visual measurements. Modifications of all three methods have been used in psychological research since the time of Fechner. Problems in learning, problems in mental testing, problems in heredity, etc., have all been studied by techniques suggested, at least, by these pioneer methods of psychophysics. But more important than their methods of research, Weber and Fechner left psychology with an attitude of research. They put psychology into the laboratory and thus paved the way for the next step in its approach to becoming a science.

THE FIRST PSYCHOLOGICAL LABORATORY

Weber was a professor of anatomy and Fechner was a professor of physics. Their experiments in psychophysics were performed in their own laboratories. They put psychology in a laboratory, but not in a psychology laboratory. This step remained for Wilhelm Wundt at the University of Leipzig. While Wundt's title was professor of philosophy, he was primarily a psychologist. He believed that psychology is a science and should be studied by experimentation in a laboratory designed for such study. Consequently, he established the world's first psychological laboratory, in the year 1879.

Soon there began a steady stream of students from all over the world to study psychology by experiment in the Leipzig laboratory. Outstanding among the Americans who studied under Wundt and later became prominent psychologists were Hall, Cattell, Scripture, Angell, Witmer, Titchener, Warren, Stratton, Judd, Arps, and many others. Most of them later became professors of psychology in American universities and, in turn, established psychological laboratories. The first one was established by G. Stanley Hall, Wundt's first American student, at John Hopkins University in 1883. This was followed by one at the University of Pennsylvania in 1888, by Cattell, and another at Toronto in 1889 by Baldwin. Today, there is a psychological laboratory in every college and university of any significance in the United States.

The psychological laboratory at Leipzig was but the next step in a long line of events that pointed to this culmination. If it had not been Wundt, certainly someone else would soon have put psychological experiments in a separate room. Experimental psychology was developing an identity of its own. The work of Weber and Fechner has already been mentioned as characteristically psychological. Perhaps Hermann von Helmholtz did as much as anyone else in laying the foundation for an experimental laboratory in psychology. He was an army physician who attracted academic attention by stating in a paper, on the conservation of energy, that the human body is no exception to nature's laws of causation. He soon became professor of physiology at the University of Königsberg. While here he measured the rate of a neural impulse, invented the ophthalmoscope, and wrote the first volume of his famous book, *Physiological Optics*. He then went to the University of Heidelberg where he was most prolific in research and writing, principally in the field of sense perception. He finished the three-volume book on *Optics*, which is still the basic reference text in this field, and wrote another almost equally famous

book on hearing. This was based on extensive laboratory research. At the age of fifty he went to the University of Berlin where he continued writing and research. Few other scientists have ever written a book that was republished 60 years after it first appeared. (*Physiological Optics* was first published in 1856 and again in 1925.)

Another man who helped to set the stage for Wundt's laboratory was Sir Francis Galton. He was a distant relative of Darwin and also interested in quantitative studies in heredity. Galton's investigations were exceedingly varied. He studied such diverse problems as the geographical distribution of female beauty, the efficacy of prayer, the experimental induction of paranoia, the heredity of genius, the measurement of mentality, the extent and type of mental imagery, the measurement of sense perception, the function of one sense through another (synesthesia), etc. His contributions in psychology come under three categories. First, he originated the study of *individual differences*. As research techniques he invented the mental test (association test) and the pedigree method (used by Dugdale in his study of *The Jukes*). Second, Galton studied *mental imagery*, using the questionnaire method. Here, he was chiefly interested in establishing hereditary resemblances. Third, and perhaps his greatest contribution to psychology, was his study of *statistics*. He originated the idea of the coefficient of correlation, although the technique was extended by one of his students, Karl Pearson. The Galton whistle for the study of hearing, the Galton bar and the angle disk for the study of vision, the odor bottles for the study of smell, the color discrimination test, and many other pieces of Galton apparatus are still found in psychological laboratories. It is also interesting that in 1884, five years after the laboratory at Leipzig, Galton opened a laboratory of Anthropometric Measurement at the International Health Exposition. This was later transferred to a museum in London. Measurements were made of 9,337 persons.

There are many others who helped to prepare the way for the first psychological laboratory. Darwin, Spencer, Romanes, Hering, J. Muller, Kulpe, and Lotze were a few of those who helped to make psychology an experimental science.

THE FIRST PSYCHOLOGICAL TEST

As mentioned above, in 1884 Galton administered psychometric measurements in sensory discrimination and "quickness of blow." In 1890 Cattell used the term "mental testing" and, soon after, administered tests in reaction time and free and controlled association

to students of Columbia University.¹ Jastrow published a "set of mental tests" in the same year.² Munsterberg exhibited mental tests at the World's Fair at Chicago in 1893. Ebbinghaus invented the completion test in 1897. Kirkpatrick compared school children on the basis of mental tests in 1900,³ and Kelly compared normal with abnormal children in 1903.⁴ However, all of these tests were of simple sensorimotor functions, such as rote memory, attention span, speed and accuracy of perception, sensory acuity, etc. There were no tests to measure the higher mental processes, such as reasoning, imagination, and judgment.

In 1905, Alfred Binet, Director of the Psychology Laboratory at Sorbonne, constructed a test to distinguish between children who were really feeble-minded and those who were merely lazy in school. By the use of fairly complex tasks this test measured attention, imagination, reasoning, judgment, and memory. It thus enabled Binet to make a more accurate estimate of intelligence than did any of the mental tests already in use. His test consisted of 30 carefully selected questions that were arranged in order of difficulty. He had tried them out on normal school children and knew what scores normal children should make. He revised the test in 1908 and again in 1911. In these revisions, he arranged the questions, or tasks, in age groups. When a question could be answered by 60 to 90 per cent of normal children of that chronological age, Binet considered it was appropriate for that age group. The following extracts from the 1911 revision will illustrate the nature of the test.

From Binet's 1911 Mental Test

Age 3:

1. Point to nose, eyes, and mouth.
2. Repeat two digits.
3. Enumerate objects in a picture.
4. Give family name.
5. Repeat a sentence of six syllables.

Age 6:

1. Distinguish between morning and afternoon.
2. Define familiar words in terms of use
3. Copy a diamond.

¹ Cattell, J. McK., and Farrand, L., Physical and Mental Measurements of Students of Columbia University, *Psychol. Rev.*, 1896, **3**, 618-648.

² Jastrow, J., Some Anthropometric and Psychologic Tests on College Students, *Amer. J. Psychol.*, 1892, **4**, 420-427.

³ Kirkpatrick, E. A., Individual Tests of School Children, *Psychol. Rev.*, 1900, **7**, 274-280.

⁴ Kelley, T. L., Psychological Tests of Normal and Abnormal Children, *Psychol. Rev.*, 1903, **10**, 345-372.

than an experimental setting. To test this theory, Watson induced the fear of white rats in a boy, Albert by name, by using a loud noise as the unconditioned stimulus for fear. Albert was first tested to make sure that he had no fear of white rats already. He obviously enjoyed playing with them. He was next tested to make sure that he had a fear reaction to a loud noise produced by striking a steel bar with a hammer. Now, could the fear reaction to the noise be transferred, by the conditioned-response technique, to the white rat? The procedure was to strike the steel bar every time Albert attempted to play with the white rat. After 10 experiences of this nature, Albert showed unmistakable signs of fear when the rat was presented alone. The rat had become the conditioned stimulus for the fear reaction. This soon spread to other furry objects. The child showed fear of a rabbit, a dog, a fur coat.

The next step was to discover if the fear reaction could now be eliminated by the conditioned response procedure, or could still another conditioned response be formed to the rat stimulus as a substitute for the fear response? What would happen if the rat, now a stimulus for fear, were experienced with food, which is a biologically adequate stimulus for enjoyment? Another child, Peter by name, who had a strong fear of rabbits, was used for this experiment. The procedure was to bring a rabbit into the room when the child was eating but it keep it too far away to produce fear. (The conditioned stimulus must always be weaker than the unconditioned one, or there will be no learning.) Gradually, the animal was brought closer and closer until the child could reach it. Finally the rabbit became a conditioned stimulus to the enjoyment reaction. It was then possible to present the rabbit without the food and still get the food reaction of enjoyment. The fear reaction to the rabbit had dropped out.

It would be difficult to overemphasize the importance of the conditioned response as a technique of experimental research in psychology. As Garrett has said, "Pavlov's contribution to experimental psychology lies in his having provided a precise technique, machinelike in its accuracy and subject directly to laboratory control. The possibilities (for further research) of the conditioned reflex methods have by no means been exhausted."¹ The conditioned-response technique lends itself to the study of problems that would otherwise be impossible. For example, as early as 1912, Pavlov had found that dogs can discriminate between tones of 1,000 vibrations per second and tones of 1,012 vibrations per second. (This is approximately twice as fine

¹ Garrett, H. E., *Great Experiments in Psychology*, rev. ed., D. Appleton-Century Company, Inc., New York, 1941.

pitch discrimination as has ever been found in a human.) No other method of research now known could possibly solve such a subtle problem.

THE ARMY TESTS

Binet's mental tests had two characteristics that limited their usefulness for the army: they could be given to only one person at a time, and their administration necessitated careful training. Consequently, when the war broke out in 1917, psychologists could offer the army no practical tools for classifying great numbers of men. A committee was appointed by the American Psychological Association, with Robert Yerkes as chairman, to prepare a test that (1) could test large groups of men at one time; (2) would be as independent of school information as possible; (3) would be sharply graded in difficulty so that it would measure superior and inferior, as well as average, mental abilities; (4) could be scored quickly and easily; and (5) could be administered by those without professional training as psychologists. As a result, two tests were developed—one for those who could read and write, the Alpha, and one for illiterates and those who could not speak English, the Beta.

The Alpha test consisted of eight types or kinds of test material arranged in subtests. These were (1) following directions; (2) arithmetic problems; (3) practical judgment; (4) synonyms and antonyms; (5) disarranged sentences; (6) number series completion; (7) analogies; and (8) general information. Within each test the items were of increasing difficulty.

The Beta test consisted of seven subtests, all of which could be administered orally or by pantomime. These were (1) pencil maze; (2) block counting; (3) X-O sequence; (4) number sequence; (5) number error checking; (6) missing part (picture); and (7) figure design. Here, too, the items within each test were of increasing difficulty.

The world's first group intelligence test, the Army Alpha, was used to measure 1,750,000 men. Of these, 8,000 were discharged because of low intelligence, 10,000 were put in special development battalions, and hundreds of thousands were assigned to army jobs most appropriate for their intelligence levels. After the war, the results were carefully tabulated and published by Yerkes,¹ Yoakum and Yerkes,² and Brigham.³

¹ Yerkes, R. M. (Ed.), *Psychological Examining in the United States Army*, *Memoirs Nat. Acad. Sci.*, 1921.

² Yoakum, C. S., and Yerkes, R. M., *Army Mental Tests*, Henry Holt & Company, Inc., New York, 1920.

³ Brigham, C. C., *A Study of American Intelligence*, Princeton University Press, Princeton, New Jersey, 1923.

However, the usefulness of the Army tests continued after the war. While other group tests were soon published, the Army tests (especially the Alpha) were widely used for many years. The fact that large groups could be tested at low expense, in comparison with the cost of the Binet tests, added to their popularity. The Army tests were used to classify school children, to compare groups (such as race and occupational groups) with each other, to guide in vocational selection, to select men for employment, to study sex differences, to evaluate treatment of the feeble-minded—in short, to promote every phase of human engineering. Undoubtedly, the postwar mental-testing fever ran too high. Tests were administered by those who were inadequately trained, especially in interpreting the results. They were used in situations for which they were not designed and for which they were inappropriate. They were often used as the only basis for decisions, instead of along with other factors that ordinarily would determine decisions. They were also handicapped by inadequate statistical procedure for their evaluation and interpretation.

But, regardless of their misuse, the Army tests marked a forward step in the progress of psychology. First, as suggested above, they popularized the possibilities of psychological tests in a wide variety of applications. While psychology tests had been used in many practical ways before the First World War, their usefulness was largely unknown to the general public. Now the public wanted to be tested.

Second, the Army tests initiated a prolific group-test construction movement. Otis, who had furnished much of the material for the Army tests, published an intelligence test in 1918. Pressey published one designed for high schools. Haggerty's Delta I (nonverbal) and Delta II appeared in 1919. The National Intelligence Test was the result of the cooperative efforts of a committee. There were many others.

Third, statistical techniques for the validation and standardization of tests developed rapidly, although much in the wake of the progress of test construction. Courses in statistics soon became a part of the curriculum of every college where psychology and education were taught.

A fourth effect of the Army tests was the rapid spread of the technique of group testing to the measurement of other traits. Tests to measure progress in every form of learning were patterned after the Army Alpha. Classroom teachers became objective-test conscious. A voluminous literature soon developed on homemade objective tests. Standardized tests were constructed to measure musical aptitude, art appreciation, mechanical aptitude, personality traits,

attitudes, beliefs, dexterity, knowledge of all sorts, psychoneurotic tendencies, etc. A national test movement was initiated by the Army tests of the First World War.

SUMMARY

A number of prescientific psychologies, still functioning in American life, have been discussed in light of scientific studies that have been made of their value. All of them—astrology, phrenology, graphology, and physiognomy—are theories that have been proved erroneous. Human character traits cannot be discovered by such procedures. Those who claim to be able to diagnose human personalities on the basis of any of these theories are charlatans. The predictions of none of them are better than chance. The oracles of the ancients were no less mystical and unreliable than the “gold bricks” of these modern “professors” of character reading.

Some of the more significant steps psychology has taken in its slow progress toward becoming a science have been reviewed. Unfortunately, mention could not be made of hundreds of other experiments that were necessary foundations on which these front-page experiments were based. Significance is so frequently built on insignificance. But whether these are truly the great experiments in psychology or not is unimportant. They serve to impress the reader with the fact that psychology is becoming objective and experimental—the necessary prerequisites to science.

RECOMMENDED SUPPLEMENTARY READINGS

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~~CHAPTER II~~

PSYCHOLOGY IN COLLEGE LIFE

How to Study

Reasons for Study

Scholarship and Intelligence

Scholarship and Success in Life

Scholarship and Extracurricular Activities

Efficient Methods of Study

Planning

Reading

Note Taking

Review and Examination

Themes, Term Papers, and Reports

How to Rest

Relaxation

Sleep

The Duration of Sleep

The Necessity for Sleep

Motility during Sleep

The Control of Sleep

The average college student is more interested in the use of psychology in his own immediate life than in any other field of application. He wants to know if and how psychology can help him to get better grades, to avoid feelings of fatigue, to secure the maximum value out of his sleeping hours, to adjust himself to his fellows and teachers—in short, he wants to know how psychology can help him in his personal problems. Two of these problems—how to study and how to rest—will be discussed in this chapter. The problem of personal adjustments will be discussed in Chap. VI.

HOW TO STUDY

Psychological research on problems of study is now adequate to justify some conclusions. While only typical examples of this research can be reviewed in the following pages, the references listed at the end of this chapter contain more details.

REASONS FOR STUDY

The first problem that confronts college students in relation to study is: How much study is advisable? Are good grades worth the

effort necessary, or is it better to devote more time to extracurricular activities and be satisfied with lower grades? This problem has been the subject of considerable research. In general, it has been found that good grades are closely related to two factors—intelligence and consequent success in life.

Scholarship and Intelligence.—Held¹ found that there is a definite relation between grades and intelligence, as measured by the Thorndike Psychological Examination. Those students who made high scores on that examination also made high grades in the university, as indicated by their high quality point average (see Table 13).

TABLE 13.—RELATION OF THORNDIKE'S PSYCHOLOGICAL EXAMINATION TO QUALITY POINT AVERAGE OF 678 STUDENTS

Percentile Score	Quality Point Average
100	1.48
90	1.38
80	1.27
70	1.15
60	1.04
50	.93
40	.82
30	.71
20	.59
10	.48
00	.37

The relation between intelligence and college grades, as indicated by the coefficient of correlation, in various studies ranges from .30 to .70, the average being around .50. The Ohio State University Psychological Test correlates with the grades of 1,030 university freshmen .68. The Carnegie Mental Abilities Test correlations with scholastic grades range from .50 to .70. In other words, good grades usually indicate superior intelligence, and, when the effort factor remains constant, superior intelligence is usually an accurate means of predicting good grades.

Scholarship and Success in Life.—The relationship of good grades to success in life after schooling is over has been studied by a number of investigators. Gifford² found that, when he compared the salaries of the employees of the American Telephone and Telegraph Company, who were college graduates, with their scholarship record, there was an obvious relationship. Those who made the best grades in college

¹ Held, O. C., *An Attempt to Predict the Success of College Freshmen in Their Adjustment to Scholastic Work*, Ph.D. Dissertation, University of Pittsburgh, 1933.

² Gifford, W. S., Does Business Want Scholars? *Harper's Magazine*, 1928. 156, 669-674.

were now receiving higher salaries than those who made low grades (see Table 14).

After investigating the success of a group of university graduates, Smith¹ concluded, "If a student belongs to the highest tenth of his class, his chances of achieving a career in life, distinguished by the approval of his fellowmen, are forty times as great as they are if he belongs to the lower nine-tenths."

TABLE 14.—RELATION OF SALARY TO SCHOLARSHIP

Scholarship in college	N	Per cent of median salary
Upper one-tenth .	498	155
Upper one-third .	1554	120
Middle one-third	1468	96
Lower one-third .	784	79

In a study of the relation of scholarship to inclusion in *Who's Who in America*, Gambrill² found that 5.9 per cent of those who made Phi Beta Kappa (a national scholarship fraternity) were later included in *Who's Who*. In two colleges she found that 5.4 per cent of those who graduated in the highest tenth of their class in scholarship were in *Who's Who*, whereas the percentage decreased with each tenth down in scholarship. (The second tenth was 2.9 per cent, the third was 2.5 per cent, the fourth was 1.8 per cent, etc.) Smith (quoted above) found that students graduating in the highest tenth of their class in scholarship have 50 times as great a chance of being later listed in *Who's Who* as those graduating in the lowest tenth.

Unquestionably, good grades are significant. In general, they indicate that a student has ability and has formed those habits that are useful in making a success in life after graduation. However, as the above data indicate, grades are not always accurate in these indications and must be interpreted with care. Teachers vary greatly in their evaluations of student accomplishments, and the grades they give are not always comparable. A low grade from one professor often represents more accomplishment than a high grade from another. Nevertheless, regardless of their inaccuracy, grades are significant goals and must be so considered by college students.

This conclusion is substantiated by Magoun's study³ of the relation

¹ Smith, H. A., *College Records and Success in Life*, Education, 1927, 27, 513-529.

² Gambrill, B. L., *College Achievement and Vocational Efficiency*, Columbia University Press, New York, 1922.

³ Magoun, F. A., Scholarship and Distinction, *Technology Review*, Massachusetts Institute of Technology, 1935, Vol. 37, No. 8

between scholarship and later distinction attained by the graduates of Massachusetts Institute of Technology (1868 to 1910). However, note in Table 15 that the lowest decile in scholarship is well represented in all the directories of men of distinction. Undoubtedly this variation from the trend in the rest of the scholarship distribution is due to other factors.

TABLE 15.—SCHOLARSHIP STANDING AND LATER RECOGNITION OF EMINENCE

Scholarship (deciles)	Who's Who in America (N 442), per cent	Who's Who in Engineering (N 795), per cent	American Men of Science (N 515), per cent	In all three (N 91), per cent
1	15.3	16.1	23.8	22
2	13.5	13.6	16.5	14.3
3	10.2	10.9	13	17.6
4	11.1	11.7	12	12.1
5	5.9	7.9	7.6	6.6
6	4.3	5.7	5.1	3.3
7	5.2	5.8	4.5	3.3
8	6.8	6.8	4.5	6.6
9	5.9	6.7	4.5	5.5
10	21.8	14.8	8.5	8.8

Scholarship and Extracurricular Activities.—While scholarship is more important, extracurricular activities also afford excellent training for success in life. They are significant indices of personal qualifications. A leader in college life will usually become a leader in post-college life. After studying the success of college men in business, Bridgman¹ concludes that "men who are outstanding in campus activities, and who are also good students, win greater success in life than those who are merely good students, or merely outstanding in campus affairs."

The question now arises: Since both extracurricular affairs and study take time, to what extent should one be sacrificed for the other? The answer is not a "one or the other" (or an "either or") one. Scholarship and leadership do not seem to interfere with each other. Remmlein² studied the relation of scholarship to extracurricular activities by comparing the "mean leadership score" of a group of students whose scholarship level was above their intelligence level, with another group whose scholarship level was below their intelligence

¹ Bridgman, D. S., *Success in College and Business*, *Person. J.*, 1930, **9**, 1-19.

² Remmlein, M. K., *Scholastic Accomplishment as Affected by Intelligence and Participation in Extra-curricular Activities*, *J. Appl Psychol.*, 1939, **23**, 602-607.

level. She found very little difference. Those students who get better grades than would be expected from their intelligence level apparently are just as active in extracurricular activities as are those students whose grades are lower than would be expected.

These results are substantiated by Williamson,¹ who found a positive relationship between scholarship and intelligence, but a negative relationship between intelligence and the number of hours studied per week. (His data are shown in Table 16.) In other words, intelligent students make good grades with but little study. The low correlations (both positive and negative) between scholarship and the hours of study indicate that good grades are due to other factors than long hours of study.

TABLE 16.—THE CORRELATION OF SCHOLARSHIP, INTELLIGENCE, AND HOURS OF STUDY

	Four studies			
	A (N 450)	B (N 221)	C (N 105)	D (N 130)
Correlations between:				
Scholarship and intelligence	.60	.28	.65	.69
Scholarship and hours studied.	.32	.00	-.06	-.28
Intelligence and hours studied.	.35	-.15	-.20	-.41
Partial correlations between:				
Scholarship and intelligence (hours studied partialled out) . . . . .	.80	.28	.65	.66
Scholarship and hours studied (intelligence partialled out) . . . . .	.70	.01	.11	.00
Intelligence and hours studied (scholarship partialled out)	-.72	-.15	-.22	-.32

From these two studies we conclude that, since both good grades and leadership in extracurricular activities are significant in postschool life, and since they do not interfere with each other, they are both desirable goals in education.

EFFICIENT STUDY METHODS

Good scholarship is not entirely a matter of ability and hard work. There are methods of study that can be learned and without which even a capable student will do work below his intellectual level. The

¹ WILLIAMSON, E. G., Relation of Number of Hours Study to Scholarship, *J. Educ. Psychol.*, 1935, **26**, 682-688.

following pages review only a few of many important factors that may affect good scholarship.

Laycock and Russell¹ made an analysis of 38 how-to-study manuals and found that 517 study skills and habits were considered important enough for discussion. Of course, no one manual covered all of them. The student whose scholarship indicates that his present methods of study are inadequate, should read the following pages carefully. Then, he should get some of the books listed at the end of this chapter and read them. There is considerable evidence that attention to good study methods is needed by the good student as well as the one who is making poor grades. Brown² found in a survey of the study habits of 120 successful students and 211 failing students that both were deficient in good study habits. His results are shown in Table 17.

TABLE 17.—PERCENTAGES OF SUCCESSFUL AND FAILING STUDENTS WITH GOOD STUDY HABITS

Habits concerning	Successful	Failing
Concentration...	34	40
Reading.....	58	61
Critical evaluation	66	67
Note taking.....	50	54
Preparation for examinations	50	55
Promptness in preparation	33	38
Reviewing..	50	51
Average	48 7	52 1

Planning.—In almost any intelligent behavior, planning is essential. Study is no exception. High-school students have their study periods, as well as their class periods, planned for them. Sometimes, the study is even supervised and directed. However, the college student must schedule his own study. Except for his class periods, nothing is planned for him. Until a student learns to plan his study periods intelligently, he is likely to squander a lot of time and then find that his work has piled up and he cannot complete it. One writer estimates that the average college student wastes enough time to enable him to hold down a half-time job. Evidence that this is not a mere conjecture is shown in Heilman's³ study. † He compared the grades of employed

¹ Laycock, S. R., and Russell, D. H., *An Analysis of 38 How-to-study Manuals*, *Sch. Rev.*, 1941, 49, 370-379.

² Brown, C. W., *Study Habits of Failing and Successful Students in the First Two Years of College*, *J. Exp. Educ.*, 1941, 9, 205-208.

³ Heilman, J. D., *Student Employment and Class Load*, *J. Educ. Psychol.*, 1939, 30, 527-532.

freshmen with those of unemployed freshmen and found that employed students are not handicapped in scholarship. The results are given in Table 18. These data are substantiated by Shaffner¹ in a study of 610 college students. She compared three groups—the nonworkers (those who worked less than 4 hours per week or none), the moderate workers (those who worked 6 to 21 hours per week), and the hard workers (those who worked 24 or more hours per week). The moder-

TABLE 18.—THE RELATION OF EMPLOYED TO UNEMPLOYED FRESHMEN IN TERMS OF GRADES

Women	Employed		Unemployed	
	N 92		N 60	
	Mean	S.D.	Mean	S.D.
Average grades	3.18	.72	3.07	.83
Intelligence	7.72	1.38	7.48	1.49
Class load	16.24	1.36	16.87	1.05
Employed, hr. per week	3.02	....	000	
Men	N 70		N 49	
Average grades	2.86	.83	2.58	.79
Intelligence	7.54	1.57	7.05	1.23
Class load	15.73	1.91	16.57	1.99
Employed, hr. per week	3.2	..	000	

ate workers were highest in scholarship, with the hard workers a close second, but there was not a statistically reliable difference between them. The nonworkers were lowest in scholarship, and this difference was statistically reliable.

College students who work or engage in extracurricular activities are forced to use their time very carefully. This means that they must plan and schedule all activities as well as class recitations. Some students, who try to get as much out of college life as possible, even schedule such activities as eating, loafing, exercise, reading the newspaper, etc. A time schedule of this nature is shown in Table 19. This schedule would perhaps fit no other student, and it was frequently altered to fit unexpected events in the life of this student. Time schedules must be custom-made.

¹ Shaffner, Mártha, The Effects of Part Time Employment on the Scholarship Ratings of College Students, *Kansas Teach.*, October, 1939.

While a time schedule should be used constantly, it should be flexible enough to permit alterations for unexpected emergencies. Football holidays, visits of parents, illness, field trips, etc., are examples of unexpected events that may upset a time schedule. However, note in Table 19 that only 45 hours per week are scheduled for school work.

TABLE 19.—TIME-DISTRIBUTION SHEET FOR JOHN DOE

Hours	Monday	Tuesday	Wednesday	Thursday	Friday
7-8	Dress and breakfast	Dress and breakfast	Dress and breakfast	Dress and breakfast	Dress and breakfast
8-9	English	Chemistry lab	English	<i>Chemistry</i>	English
9-10	<i>Psychology</i>	Chemistry lab	<i>Psychology</i>	<i>Chemistry</i>	<i>Psychology</i>
10-11	Psychology	Chemistry lab	Psychology		Psychology
11-12	<i>French</i>	Chemistry lab	<i>French</i>		<i>French</i>
12-1	Lunch and newspaper	Lunch and newspaper	Lunch and newspaper	Lunch and newspaper	Lunch and newspaper
1-2	French	Chemistry lecture	French	Chemistry lecture	French
2-3	Economics	<i>French</i>	Economics	<i>French</i>	Economics
3-4	<i>English</i>	<i>Psychology</i>	<i>English</i>	<i>Psychology</i>	<i>English</i>
4-5	Athletics	Athletics	Athletics	Athletics	Athletics
5-6	Athletics	Athletics	Athletics	Athletics	Athletics
6-7	Dinner and rest	Dinner and rest	Dinner and rest	Dinner and rest	Dinner and rest
7-8	<i>Chemistry</i>	<i>Economics</i>	<i>Chemistry</i>	<i>Economics</i>	<i>Chemistry</i>
8-9	<i>Chemistry</i>	<i>Economics</i>	<i>Chemistry</i>	<i>Economics</i>	<i>Chemistry</i>
9-10	<i>Economics</i>	<i>English</i>	<i>Economics</i>	<i>English</i>	<i>Economics</i>
10-11	*	*	*	*	*
11-	Retire	Retire	Retire	Retire	Retire

* These hours are for extra study purposes, such as examinations term papers, special assignments, etc.

NOTE: Mr. Doe worked on Saturday and did not study on Sunday.

Italicized subjects indicate study hours.

This student still has 7 hours per week for emergencies, not counting Saturday and Sunday. Even with athletics and outside work, only the most extraordinary events would justify this student's getting behind in his school work for more than a few days.

A time schedule must also fit the learning ability of each student. The student in Table 19 spends but 5 hours per week in the study of French. For another student, 10 hours per week may not be enough. Even the total hours spent in study per week will vary greatly with

the ability of the student. Bird¹ found that students in a how-to-study course ranged from 7 hours per week to 53 hours per week in time devoted to study (see Fig. 3).

As suggested in Table 16 above, Bird also found that students who spent more than 35 hours per week in study did not receive high grades. They are usually students of less than average college ability and must study long hours in order to pass their courses. On the other hand, those who study less than 15 hours per week "typify most often the capable student who earns average grades. In a larger sense, he is the real college failure."

The fact that the average college student spends but 26.29 hours per week in study certainly is evidence that college students are not

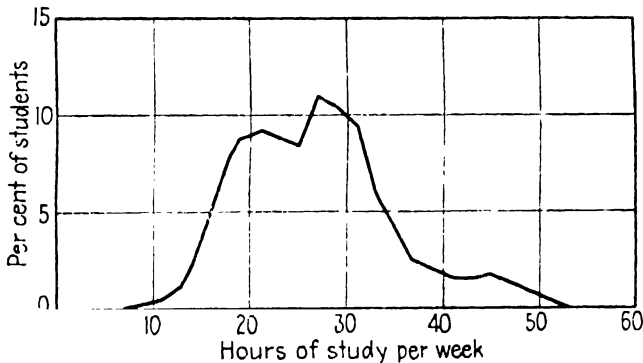


FIG. 3 —Hours of study for 108 students.

being overworked. If the average classroom hours are added to this, the average student's week becomes but 41.29 hours. Hutchinson and Connard² found that 503 college women (at a college for women) spent but 38.3 hours per week in both study and the classroom. We must conclude, then, that the average college student could do more work if he would plan his time more intelligently.

Reading.—The amount of reading varies greatly from course to course but, on the whole, it is the most usual technique of study. In fact, reading is the only method of study for such courses as history, economics, sociology, etc. A student who is not proficient in reading is handicapped at the college level.

The degree to which college students are deficient in reading is

¹ Bird, Charles, *Effective Study Habits*, p. 53, D. Appleton-Century Company, Inc., New York, 1931.

² Hutchinson, R. G., and Connard, M. H., What's a College Week? *Sch. & Soc.*, 1926, 24, 768-772.

indicated in a number of studies. Arnold¹ found that 7 per cent of a group of college students were below the eighth-grade average in reading comprehension and 30 per cent were below the same norm in reading speed. Pressey² found that 20 per cent of university freshmen read less efficiently than the eighth-grade level. Bird³ found that only 89.6 per cent of a group of university students exceeded the eighth-grade level in reading comprehension and less than half of the group (47.5 per cent) reached the senior-high-school level. Cole⁴ concludes that "the average degree of skill in reading shown by unselected freshmen is clearly not sufficient for the needs of college students." The data on which she bases this conclusion are shown in Table 20.

TABLE 20.—PERCENTAGE OF FRESHMEN ABLE TO READ WITH TENTH-GRADE COMPREHENSION

Directions for experiments, writing themes, carrying out projects, etc.	61
Presentation of theories, rules, or laws with illustrations.	70
Description of apparatus, processes or organisms.	57
Discussion of developments or causal relationships.	67
Narratives.	82
Diagrammatic drawings.	69
Linear graphs.	72
Cross-section drawings.	42
Maps.	73

Now the question is: Can students who are poor readers learn to read well enough to earn grades equal to their mental levels? Book⁵ answers this question as follows, "Experiments have shown that with a moderate amount of practice, speed in reading may be increased from 50 to 100 per cent if one's attention is directed sharply enough toward this particular point." Pressey⁶ gave remedial reading training to a group of freshmen who were low in reading ability and compared their resulting grades with a matched untrained control group at the end of the term. The trained group received an average of 1.68 grade honor points, while the control group received but 1.41 honor points. This is equivalent to at least one letter grade difference. About half the

¹ Arnold, H. J., *Disabilities of College Students in Certain Tool Subjects*, *Phi Delta Kappan*, 1929, 11, 169-174.

² Pressey, L. C., *Training College Freshmen to Read*, *Ohio Col. Assn. Bull.* 55.

³ Bird, Charles, *Effective Study Habits*, p. 99, D. Appleton-Century Company, Inc., New York, 1931.

⁴ Cole, Luella, *The Background for College Teaching*, Rinehart & Company, Inc., New York, 1940.

⁵ Book, W. F., *How to Succeed in College*, Warwick & York, Inc., Baltimore, 1927.

⁶ Pressey, *op. cit.*

experimental group improved in reading to equal or surpass the median for the entire freshman class. (This group received an average of 1.97 grade honor points.) Lauer¹ studied the effects that 20 practice periods in improving the rate of reading had on a group of 367 college students. The average initial rate was 247 words per minute. The improvement ranged from 0 to 249 per cent—the average being 35.3 per cent. He found that fast readers made more improvement than slow readers and that, in general, college students do not improve in reading unless some "regular remedial program is carried out." Consequently we can conclude that both reading speed and reading comprehension can be learned, and these will result in improved scholarship.

There are three factors involved in improving reading ability. First, a student should learn to read more rapidly. He should force himself to read just as fast as possible without loss of comprehension or meaning. He should break the habit of dawdling when he reads. It is best to practice easy material, like the newspaper, every day for 15 or 20 minutes. Some students keep a weekly record of the time it takes to read 10 inches of newsprint with satisfactory comprehension. After a few weeks, a graph can be made to show the increase in reading speed.

Reading speed is frequently handicapped by lip movements. Silent reading should be free from any kind of silent speech. Huey² found as long ago as 1908 that good silent reading is approximately twice as fast as oral reading. When the vocal organs are used, they slow up the speed of the eye in seeing and the brain in comprehension.

The second factor involved in reading ability is word knowledge. Obviously, it is impossible to understand the meaning of a sentence if the words in it are not understood. Some students look up the meaning of all unfamiliar words in the dictionary and then write an abridged definition in the margin of the book in which the word is found. While this is an excellent habit for books which are personally owned, it is not recommended for borrowed and library books. Another good practice is to write new words and their definitions in a special section of a notebook. If a separate notebook is used for each course, there should be a new-word section in each one. Douglass and Barrow³ found that at all levels of intelligence students who have the habit

¹Lauer, A. R., *An Experimental Study of the Improvement in Reading by College Students*, *J. Educ. Psychol.*, 1936, **27**, 662-665.

Huey, E. B., *The Psychology and Pedagogy of Reading*, The Macmillan Company, New York, 1908.

³Douglass, H. R., and Barrow, H. C., *The Study and Practice of 395 High School Pupils*, *J. Educ. Psychol.*, 1938, **29**, 36-43.

of looking up new words in the dictionary make higher grades than those who do not.

Whatever method is used in remembering word meanings, a good dictionary is a necessity. The G. & C. Merriam Company and the Funk & Wagnalls Company both publish excellent collegiate dictionaries. No textbook is more important to a college student than a dictionary.

The third important factor in reading ability is analysis for thought content. The purpose of reading is to get ideas. Each chapter, each section, each paragraph, contains a central idea. The reader should get the central idea and the supporting ideas from his reading. This requires analysis.

There are a number of techniques, or procedures, or rules, for reading to facilitate analysis. While they are all beneficial, they are not "musts" because they are not used by all good readers. However, poor readers will find that they are helpful. A procedure widely recommended is first to look over the reading assignment hurriedly to see what it is about, or find the trend or progress, before reading more carefully. This hurried overview will reveal the plan of the chapter and constitute a background for more thorough reading. It enables one to avoid becoming lost in the details. It helps one to understand how details are related to each other. Sometimes a preliminary survey is given at the beginning of chapters in the form of an outline (as in this book), or a synopsis. Sectional and topic headings facilitate a preliminary survey of the important features of a chapter. If neither of these aids is given in a book, sometimes there is a summary at the end of the chapter that will assist the reader in getting this overview.

TABLE 21.—RELATION OF READING TIME TO RECITATION TIME IN RECALL

Proportion	Immediate recall	Delayed recall
Reading with no recitation.	100 (Base)	100 (Base)
Reading with $\frac{1}{2}$ recitation	112	115
Reading with $\frac{2}{3}$ recitation	119	146
Reading with $\frac{3}{4}$ recitation	122	162
Reading with $\frac{4}{5}$ recitation	120	152

Another important technique for improving the effectiveness of reading is self-recitation, or the practice of mentally reviewing important ideas in the material read. Experiments indicate that when a student spends part of his study time reciting (to himself) the important facts in material he has read, he remembers them much better than when he spends his whole study time in reading alone. Years

ago, Gates¹ investigated the effectiveness of various proportions of study time to recitation time. He found that recitation was more effective than mere reading in all proportions. His results are summarized in Table 21.

Germane² compared a group of students who spent their entire study time in reading with another group who spent half the time in reading and half in answering (to themselves) questions about the material read. The advantages of the second procedure were 30 per cent for college sophomores and 50 per cent for grade-school pupils.

Reading effectiveness is also improved by the procedure of deliberately looking for the keynote of each chapter, each section, each paragraph. Tables, graphs, and charts contain valuable information that can be obtained only by looking for it. Too many students pass these up without notice. Some students find it helpful, when they have found a keynote idea, to underscore it in the book or make a check mark in the margin. Of course, this is recommended only when the book is owned by the reader. To make the important things more noticeable, it is effective to use a red lead pencil for underscoring. Marshall³ trained one group of students in underlining important words and ideas and then compared their progress with another equated group not so trained. The results (see Table 22) on two units

TABLE 22.—EFFECTS OF SPECIAL TRAINING IN HOW TO STUDY

	Control group mean	Experimental group mean	Difference in favor of experi- mental group
Otis S-A Intelligence Test.	47.9	49.7	1.8
Test on first unit.	58.4	68.0	9.6
Test on second unit.	62.9	67.2	4.3

of subject matter indicate a superiority of the experimental group. Some students take notes in the form of outlines, summaries, or synopses. Certainly some method of distinguishing the important from the unimportant should be used. It is a waste of time to read unless facts and ideas are being communicated from the writer to the reader. Unless these are recognized and identified by some method, they are missed and there is no communication.

¹ Gates, A. I., Reciting as a Factor in Memorizing, *Arch. Psychol.*, 1917, No. 40.

² Germane, C. E., The Value of the Controlled Mental Summary as a Method of Studying, *Sch. & Soc.*, 1920, 12, 591-593.

³ Marshall, M. V., Guided Study with College Juniors, *Sch. & Soc.*, 1938, 48, 38.

Note Taking.—Whether a student takes notes on his text-book reading or not, he must use this procedure of retaining facts and ideas that he gets from his library reading and his classroom lectures. The notebook should be a depository into which is constantly being poured facts and ideas from various sources. It thus becomes the student's most valuable source of information. If he makes his notes in a clear, concise, and classified manner, he will have immediately available concentrated information ample for passing all tests that he may confront. In fact, a good notebook is often useful years after the student has graduated. It is a very important factor in the education of any student.

Notes for each course should be kept together, either in a separate notebook or in a separate part of a large notebook. Systematic classification is a basic fundamental for all useful notebooks. When notes are taken in a haphazard manner, they are of little value. Of course, class notes must be taken quickly and are usually poorly organized. For this reason, it is better to rearrange and copy them in a more careful manner. Elaboration and reinterpretation of class notes before they "get cold" is an excellent procedure for getting the most out of a course.

The form, or pattern, of note taking varies with students. Some take their notes in outline form, in which each item is subordinate to, superordinate to, or coordinate with, every other item. Main items are designated by Roman numerals, subitems by capital letters and indentation, and more subordinate items by Arabic numerals and small letters. Other students take notes in the form of synopses and summaries. This requires less organization and weighting of items than does the outline method. Consequently, notes can be taken more quickly without sacrifice of content. There is, of course, a loss of perspective and relationship. Another plan of note taking is to record just those important items that should be remembered. Notes are not taken on everything read or heard in a lecture, but just those facts and ideas that are worthwhile are recorded. This means that there are gaps and lack of relationship between facts as they appear in a notebook. Each item is discreet and significant for its own sake. The notebook then becomes a storehouse of significant, though not carefully organized, items. Consequently, it is of less value at a later time when relationships are no longer remembered. Also, it is more difficult to find a specified item of information when notes are taken in this fashion.

However, most any method of note taking is better than none at all. Too many students do not take notes in any manner. One of

the best studies of the value of note taking was made by Barton¹. He compared the school progress of an experimental group of high-school students specially trained in note taking with a control group that was equal in all other respects except that it was not trained in note taking. The experiment was performed in three different schools and involved 94 pairs of students. The results were definitely in favor of the group trained in note taking. In fact, "the chances are 9,999 in 10,000 that true difference is greater than zero." (See Table 23 for a summary of the results.)

TABLE 23.—COMPARISON OF PUPILS TRAINED IN NOTE TAKING WITH CONTROL GROUP

	Experimental group	Control group	Difference	S.D. of the diff.
Mean.....	37.7	27.3	10.4	2.2

Crawford² studied the relation of note taking to school marks and found correlations ranging from .36 to .66 with a median of .50. "The immediate value of notes is less than the delayed-review value," but, "when results are measured by a general quiz after a period of

TABLE 24.—COMPARATIVE VALUE OF NOTE TAKING IMMEDIATELY AND AFTER INTERVAL OF TIME

Type of test	Interval after learning	Score with notes	Score without notes	Difference in favor of notes
Essay.....	Short	10.70	10.32	.47
True-false.....	Short	7.96	7.45	.51
Essay.....	Long	12.89	5.06	7.83
True-false.....	Long	15.33	12.62	2.71
Both types*.....	Long	19.33	16.93	2.40

* This was a library reading only.

days and weeks and after there has been opportunity to review the notes which were previously taken, the note-takers showed marked superiority over those who do not take notes." These results are indicated in Table 24.

¹ Barton, W. A., *Outlining as a Study Procedure*, Teachers College, Columbia University Press, New York, 1930.

² Crawford, C. C., A Correlation between College Lecture Notes and Quiz Papers, *J. Educ. Res.*, 1925, **12**, 282-291. Also, An Experimental Study of the Results of College Note Taking, *J. Educ. Res.*, 1925, **12**, 379-386.

While Bird¹ regrets that there does not yet exist "convincing evidence to prove the value of notes to a student," yet he ventures the opinion that "it is probable that the greatest advantage to learning lies in the process of making notes."

Review and Examination.—Frequent review and examination are exceptionally valuable aids in learning. The teacher who gives but one or two examinations during a course is putting a great handicap on the learning of her students. There are a number of reasons why this is true. First, frequent examination enables the student to keep informed of his progress. Numerous studies indicate that when a student knows the amount and rate of his progress he will learn more than when he does not know how well he is doing. Years ago, Book

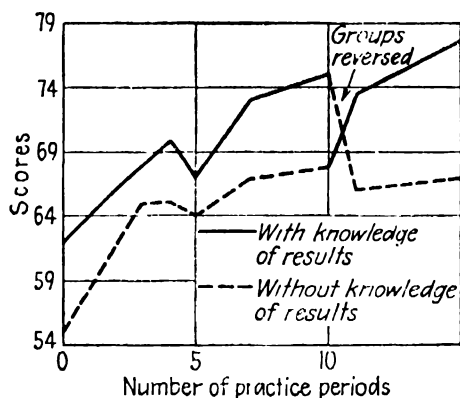


FIG. 4.—The effects of knowledge on performance.

and Norvell² compared the learning of a group of university students who were informed of their learning progress with a control group who were not so informed. The results were so obvious that at the end of the tenth practice period the groups were reversed and the control group was informed of their progress while the other was not. These results are shown in Fig. 4.

Second, frequent examination means frequent review, more study, and more learning. Review for examination must not be confused with "cramming." Review is checking up and refreshing that which has already been learned, while cramming is original learning at the last minute. Review enables the student to get a bird's-eye-view of the course and see each part in perspective. It enables the student to

¹ Bird C., *Effective Study Habits*, D. Appleton-Century Company, Inc., New York, 1931.

² Book, W. F., and Norvell, L., *The Will to Learn*, *Ped. Sem.*, 1922, **29**, 303-362.

get out from among the trees and see the woods. Consequently, students should welcome examinations. Ross¹ found that weekly examinations have a definite positive value to college students in psychology courses. (See his results summarized in Table 25). This value is especially obvious with weaker students.

TABLE 25.—GAINS MADE BY STUDENTS TESTED WEEKLY OVER A CONTROL GROUP TESTED ONLY AT END OF TERM

	Experimental group	Control group	Differ- ence	P E. of diff.	Chances in 100
Instructor R	49	37.88	11.12	2.3 ¹	100
Instructor H	49	44		2.56	91

The best preparation for examinations is daily study. The student who keeps up with his courses needs no long all-night review. He merely reviews his notebook and the underscored parts of his textbook, and he is ready for any examination. He does not cram; he reviews.

If the examination is the essay type, each answer should be carefully planned before it is written. In fact, the essay test asks for a short essay on each question. Answers should not be a series of hodge-podge ideas that are written down just as they occur to the student. A good essay test paper is written after an outline has been constructed at the expense of precious examination time. However, it should be noted that as a measuring device the essay examination is condemned for its low reliability (*i.e.*, different instructors give it different scores.) Ashburn² found that when several teachers graded the same essay test papers, the passing or failing of 40 per cent of the students examined depends on *who* grades the papers. Also, 10 per cent of the students will pass or fail depending on *when* the papers are graded. Not only do instructors disagree as to the value of a paper but they do not agree with themselves when they grade papers at different times. Nevertheless, the essay test is still widely used.

In objective examinations, the important thing is to read the statements carefully. A wrong answer because of misinterpretation is just as wrong as though it were due to ignorance. Some students and even some instructors have developed the foolish belief that an

¹ Ross, C. C., and Henry, L. K., The Relation between Frequency of Testing and Progress in Learning in Psychology, *J. Educ. Psychol.*, 1939, **30**, 604-611.

² Ashburn, R., An Experiment in the Essay Type Question, *J. Exp. Educ.*, 1928, **7**, 1-3.

objective examination should be taken hurriedly and with but little deliberation. They believe that it should represent the student's first impression. This is utterly wrong. Each statement should be studied carefully and answered only after careful deliberation. If time permits, the test should be gone over again and those answers that appear wrong on more deliberate thought should be changed. Objective examinations are usually carefully prepared and should be just as carefully answered. Berrein¹ found that students improve their scores on objective tests by going back over them and changing answers that appear to be wrong. His results are shown in Table 26.

TABLE 26.—EFFECTS OF CHANGING ANSWERS ON OBJECTIVE EXAMINATIONS

	Number	Per cent
Lowered score . . .	34	22
Raised score. . . .	99	64
Score unaffected . .	15	10
Made no changes.	6	4

TABLE 27.—RANK OF EXAMINATION TYPES IN RELIABILITY AND VALIDITY AS SHOWN BY VARIOUS STUDIES

Study by	Test type			
	Comple- tion	Multiple choice	True- false	Essay
In reliability:				
J. S. Kinder. . . .	3	1	2	4
A. C. Eurick. . .	2	1	4	3
In validity:				
S. G. Brinkley. .	1	2	3	4
E. P. Wood.	1	2	3	4
A. C. Eurick. . .	2	1	4	3
Summary rank. .	2	1	3	4

There are three widely used types of objective test questions—the completion, the multiple choice, and the true-false—that have been carefully studied for reliability (consistency) and validity (whether or not the test measures the factor it purports to measure). In general, the multiple-choice type of question has been found to be the most reliable, and the completion type to be the most valid.

¹ Berrein, F. K., Are Scores Increased on Initial Tests by Changing the Initial Decision? *J. Educ. Psychol.*, 1940, **31**, 64-67.

Kinney and Eurick¹ have summarized a number of these studies; their results are shown in Table 27.

Themes, Term Papers, and Report.—There are two stages in the preparation of a theme or term paper or report—first, collecting or developing the information and ideas, and second, stating it in written form. Many students sit down to write a theme and, because they have not performed the first stage (preparation), they conclude that they are not in the mood. Writing is impossible without something to write about. It is a means of communication. If there is nothing to communicate, obviously there can be no writing. The procedure of getting ideas or facts to communicate varies with the nature of those ideas or facts. Sometimes they are best obtained from books in the library. If so, a notebook is all the equipment necessary. However, facts and ideas are sometimes best obtained from an inspection trip, or an experiment, or an interview, or a survey, or a session of good hard thinking. If so, specialized training, financial expenditure, time, travel, and the assistance of others may be necessary. Whatever the nature and the requirements of this fact-getting stage, it is fundamental.

The second stage is to record, or communicate, the information amassed in written form. This is a skill step and can be acquired in no other way than by practice. The only way to learn to write is to write and rewrite. The more practice, other things being equal, the more perfect the skill. But writing, like any other intelligent behavior, must follow a plan, or an outline. Otherwise, even the best writing is ineffective. This book, for example, was carefully planned long before a single word of manuscript was written. Of course, the plan may change as writing progresses and relationships become more clear. Even the plans for a building are often changed during construction. However, the plan of a theme or a term paper is usually determined by the teacher or department making the assignment, so the student need only follow instructions.

There has been much argument among educators about the learning value of themes and term papers in courses on the college level. (Of course, their value in written English classes is admitted). Some think they impose mere busy work upon the student for which he receives but little value. They believe that the time would be better spent in textbook study and assigned library readings. Bird² dis-

¹ Kinney, L. B., and Eurick, A. C., *A Summary of Investigations Comparing Different Types of Tests*, Sch. & Soc., 1932, 36, 540-544.

² Bird, A., *Effective Study Habits*, p. 177, D. Appleton-Century Company, Inc., New York, 1931.

agrees with this point of view. "The term paper challenges thinking and the assembling of pertinent information; it offers an opportunity to develop the skills required in undertaking original investigations; and it has an educational significance beyond that of almost all other forms of course assignments"

McClusky¹ studied the value of the term paper as a learning procedure by ascertaining its effect on objective examinations. He equated two groups of college students on the basis of their scores on the Army Alpha Intelligence Test and the Chapman-Cook Reading Test. He assigned a term paper to one group and announced an approaching examination to the other. Three weeks later, he gave the test to both groups (unannounced to the term paper group). Ten days later he repeated the same test without notice. The results are shown in Table 28. The author comments as follows, "Writing

TABLE 28 --EFFECT OF WRITING A TERM PAPER ON EXAMINATION GRADES

Group	Number	Intelligence score	Reading score	First test score	Second test score	Time spent on term paper or review
Term paper	42	157	22 9	31.3	33 1	10 9
Review	38	153	22 7	32 5	32.3	5 8

a term paper is far superior to the customary direct preparation for an examination because, without involving the disadvantages of direct preparation, the paper achieves the same factual material and carries with it the exercise of the higher mental processes of organization and creative expression."

HOW TO REST

Equally as important as how to study, for college students, is how to rest. Being young and energetic, students often do not realize that the efficiency of the human body is affected by its operating condition. Perhaps the most significant factor in the maintenance of good bodily condition is *rest*. Habits of rest are formed during youth. Consequently, it is important for college students to realize what sort of rest habits they may now be forming. There are two important aspects of this problem—relaxation and sleep.

¹ McClusky, H. Y., An Experimental Comparison of the New Type Test and the Term Paper, *J. Appl. Psychol.*, 1933, 17, 621-627.

RELAXATION

The rest cure is being prescribed more and more by physicians for more and more different reasons. It has long been recognized as an essential part of the treatment of neurasthenia and other nervous disorders. Due in part to the increased *tempo* of modern civilized living and in part to clinical research, muscular and nervous tensions are now considered to be important causes of peptic ulcers and other gastrointestinal disorders, various cardiac maladies, hyperthyroidism, arthritis, pulmonary tuberculosis, etc.

Jacobson¹ lists five values of rest that indicate its importance both in medical practice and in maintaining health.

1. It repairs fatigue or exhaustion, thereby increasing the general resistance of the organism to infection and other noxious agents.
2. It decreases the strain on the heart and the blood vessels.
3. It diminishes the energy output and thus also the required calorie intake.
4. It quiets the nervous system, thus tending to relieve excitement, heightened reflexes, and often spastic states.
5. It diminishes the motion of affected body parts, thereby averting possible strain and energy.

There is less energy being consumed during rest than during activity. (Of course, the number of calories used by an individual depends on his size and other factors, as well as on his activity.) Langworthy and Barrott² found that while sitting in a chair an individual uses about 60.7 calories per hour, or less than 1,000 per day (16 hours). Sewing requires about 70 calories per hour and sweeping the floor about 100 per hour. In vigorous exercise, like playing football, an individual may use as much as 1,200 to 2,000 calories per hour. This is more than some other person will use in an entire day.

However, rest is more than merely sitting down and becoming inactive. It is *relaxation*, or freedom from unnecessary muscular and nervous tensions. The human body is so constructed that every muscle has an opposite. The contraction, or tension, of a muscle will move an arm or a leg, but the opposing muscle must contract to move it back again. Muscles have only the power to contract. They cannot expand. In a repetitive movement, like walking, a muscle must contract and then quit contracting, or relax, as soon as its opposite begins. Otherwise, they will interfere with each

¹Jacobson, E., *Progressive Relaxation*, University of Chicago Press, Chicago, 1938.

²Langworthy, C. F., and Barrott, H. C., Energy Expenditures in Household Tasks, *Amer. J. Physiol.*, 1920, **52**, 400.

other. If both contract at the same time, there is no movement. However, there is a state of tension. Both muscles are working although nothing is being accomplished. Such tension states are necessary for body posture. It is impossible to sit or stand unless the muscles hold the body in position.

Thus, the two functions of muscles are to move the body and to hold it in position. If a muscle is not necessary for either function, it should then be in a state of relaxation. A muscle should not contract unless that contraction is useful.

There are two faults a person may develop in using his muscles. First, he may contract too many muscles when he moves his body or any part of it. Skill and gracefulness in muscle movement depend on whether or not he is able to use just the muscles necessary and no others. Awkwardness results from the use of more muscles than necessary for the movement desired. The golfer who does not learn this does not become a good golfer nor a graceful one. Skill in anything exists only after all unnecessary muscular contractions have been eliminated.

Second, a person may use too many muscles in maintaining his body posture. When a soldier learns to maintain posture with a minimum of muscular tension, he is able to stand at attention for hours without serious fatigue. When the public speaker learns to stand before an audience without contracting more muscles than necessary to give him good posture, he is not likely to experience the trembling knees so characteristic of the overtense speaker.

It is obvious that a person who uses more muscles than are necessary for movement and posture, or who contracts them more vigorously than necessary, will become fatigued more quickly than another who uses just the right muscles to the right degree. Young people should learn to move and to hold posture with as many muscles relaxed as possible. In other words, they should learn to rest as many muscles as possible for as much of the time as possible.

Muscular contractions and tensions produce so many fatigue products and damage the bodily mechanism to such an extent (catabolic processes) that major rest periods for rehabilitation and recovery are necessary. These enable the body to throw off accumulated waste products and make anabolic repairs. Such periods are usually accompanied by a cessation of those sensorimotor processes located in the higher centers (cerebral cortex). These will be discussed in the next section of this chapter. Of course, minor rest periods are always interspersed throughout the awake period and enable the body to make partial recovery. The efficiency of the human body depends on

these minor rest periods (see Chap. XV for further discussion of this point).

It is now obvious that the most complete rest or relaxation can take place only when the body is in a reclining position. In any upright position, muscle tension is necessary for posture. The sitting position requires less tension than the standing position (and therefore permits more rest), but both require more tension than the reclining position. This is the position the human body takes for those major rest periods, called sleep. However, the mere fact that a body is in a reclining position does not prove that it is relaxed. Some people have difficulty in relaxing in any position. Activity and posture have become so habitual and rest periods have become so infrequent in the lives of many people that they have lost the ability to relax. How to regain the ability to relax and how to form the habit of relaxing will be the objective of the rest of this discussion.

Jacobson has found that it is possible to reacquire the ability to relax. The first step is to learn what relaxation feels like. A person may recline and think that he is relaxed, yet may have residual tension. Often he is not able to recognize the difference between real relaxation and this state of partial tension. Or, he may realize that he is not relaxed but be unable to locate the muscles that are yet partly tensed. Jacobson's procedure is for the patient to recline and practice tensing and relaxing isolated muscles. For example, practice may begin with tensing and relaxing just the muscles of the right arm. This is done over and over again until the patient learns to recognize the feel or experience of those muscles in tension and in relaxation. From here on the practice is in relaxation only. This initial practice is to enable the patient to learn what he should not do. Relaxing is not doing something but doing nothing. It is refraining from doing something. Obviously, the first step is to learn what not to do and how to avoid doing it.

After the patient has learned to relax his biceps and knows what it feels like when they are not relaxed, he then follows the same procedure with another muscle, and then another, until all the muscles of his body can be relaxed individually. This often takes a long time and diligent practice. He must learn to tense the muscles of the third finger of his left hand, for example, and then relax them in isolation from other related muscles. The object is to teach him to recognize and locate feelings of tension in any part of his body.

The same procedure then extends to muscle combinations. All muscles in the right arm, for example, are relaxed together. By this time he will be able to recognize if a muscle in his arm is not relaxed and

to locate it. When the relaxation of the muscles of the right arm is mastered, he then extends his training to the left arm and then to all other parts of the body. Finally, after much practice, he learns to relax all parts of his body together. He is then ready for the next step in his training.

There are degrees of relaxation. A muscle is seldom either tense or relaxed. It is usually only partly relaxed even when the patient is reclining and feels relaxed. The instructions Jacobson gives his patients are, "You are to continue on and on, past the point where the part seems to you perfectly relaxed." It may take 15 minutes to relax completely a single muscle. Even the person who has learned to relax and has practiced it for years can lie down and feel a muscle relax more and more and more, even for as long as 5 minutes. This is progressive relaxation.

Relaxation cannot be learned quickly. It takes conscious practice and then more practice. Over and over again, separate muscles must be relaxed more and more completely. It takes the average individual weeks to learn how to lie down, or sit down, and do nothing.

After one has learned to relax the large skeletal muscles of the arms, legs, and trunk—completely or deeply—the next step is to learn to relax the delicate muscles of the eye, ear, throat, viscera, etc. This is definitely more difficult. However, the procedure is exactly the same. For example, the patient is asked to close his eyes tightly and then to relax them without opening his lids. Then, he is asked to turn his eyes to the right and relax; then to the left and relax. He is then instructed, "Just let your eyes go. Do not look in any direction." After a while the patient learns to relax his eyes until, even with the lids open, the eyes are not seeing.

The most difficult relaxation to learn is that of the muscles of speech. It is difficult to relax the processes of implicit speaking. First, the patient must realize that he talks to himself (or thinks) with implicit or subvocal muscle tensions. Whether he identifies thought processes with this implicit speech or not is unimportant, as long as he realizes that there is a relationship. He must learn to recognize the experience of implicit speech muscle tensions. Then only can he learn to relax them. When accompanied by the relaxation of other muscles, the relaxation of the implicit speech muscles produces a state of borderline sleep which is about the last stage of progressive relaxation.

Relaxation must not be confused with the hypnotic state. In fact, there is but little in common. Hypnosis is produced by suggestion, and the patient becomes more and more suggestible. Relaxation

has nothing to do with suggestion. The patient is no more suggestible when he is relaxed than when he is tense, nor does suggestion promote relaxation.

The therapeutic value of relaxation in the treatment of various afflictions cannot be overemphasized. Some of Jacobson's results along this line are shown in Table 29. However, being able to relax is just as important to the healthy as to the afflicted. Perhaps relaxation will become a significant part of health and physical training in the future.

TABLE 29.—THE VALUE OF RELAXATION IN THE TREATMENT OF VARIOUS AFFLICTIONS
(After Jacobson)

Improvement as reported by	Disorders					
	Nervous hypertension	Insomnia	Anxiety states	Cyclothymic depression	Stuttering	Phobias
	(N 82)	(N 34)	(N 5)	(N 14)	(N 2)	(N 5)
The physician:						
1. None	0	0	0	2	0	0
2. Doubtful	4	1	0	1	1	0
3. Slight	7	6	2	0	0	0
4. Marked	33	12	0	2	0	1
5. Very marked	38	15	3	9	1	4
The patient:						
1. None	1	0	0	2	0	0
2. Doubtful	1	0	0	2	0	0
3. Slight	4	4	2	2	0	0
4. Marked	27	13	0	0	1	1
5. Very marked	49	17	3	8	1	4

Another phase of Jacobson's work that interests the applied psychologist is the function of relaxation while on the job. If training in relaxation will enable us to perform our daily activities with less effort, it is certainly worth attention. For example, with relaxation these words are written with less effort than might be used ordinarily. Driving a car can be very fatiguing unless the driver is relaxed and handles the wheel with a minimum of effort. A soldier can stand at attention with no more effort than he can stand at ease if he knows how to maintain posture while partially relaxed. As the golfer improves his score and the singer improves his resonance by proper relaxation, so can the day laborer, or the man at the bench, or the one at the desk,

perform his work with less effort if he learns how to relax. This is a phase of fatigue that has too long escaped the attention of the efficiency expert.

SLEEP

Sleep is the natural cessation of those complex sensorimotor processes by which the organism adjusts itself to its environment. It is distinguished from unnatural cessations of adjustment—such as coma, trance, anesthesia, etc.—in that the subject can be awakened or returned to an adjusting state by ordinary procedure. During sleep there is a decrease in pulse and metabolic rates, a fall in blood pressure, and a change in the rhythm of brain waves. While sleep is more or less regular and periodic, it can be induced at irregular times by fatigue, monotony, relaxation, suggestion, etc. Sleep is a natural state of highly reduced sensorimotor activity that is distinguished from the awake state principally by the absence of consciousness.

The function of sleep is to enable the body to repair the damages done to it by the activity and tensions of the awake state. Fatigue poisons are thrown off, tissues are built up by anabolic processes, sugar is stored in the liver and fat in the tissues. In fact, the whole body is rehabilitated for another state of awake activity. Sleep is a period in which the body reconstructs itself and thus minimizes the wearing-out effects of living.

The Duration of Sleep.—A common topic of discussion among college students is—how much sleep is necessary? Edison is supposed to have averaged but 3 or 4 hours sleep in each 24-hour period, yet health authorities commonly advise at least 8 hours sleep. What are the minimum sleep requirements for good health? Beyond what time does sleep become a waste of time, or perhaps a luxury?

Kleitman¹ claims that standard sleeping-hour schedules, especially for children, have always recommended too much sleep. "Since from birth to adulthood the actual observed sleep-duration values are consistently and evenly lower by 1 hour than the prescribed, it is time to discard the theoretical scale in favor of the empirical one." The truth of this statement is suggested in Fig. 6, which shows the time actually slept by American children. To force a child to stay in bed for longer periods, merely because the Children's Bureau booklets recommend more sleep, is to invite him to form nonsleeping habits in bed.

Some studies show, however, that superior people sleep more than

¹ Kleitman, N., *Sleep and Wakefulness*, University of Chicago Press, Chicago, 1939.

the average. Terman¹ found in his studies of superior children that they sleep longer on an average than do unselected children. (That is, from ages seven to fourteen. Below the age of seven there were no differences.) These data are shown in Fig. 5. Laird² reports that men who have attained distinction in life sleep on an average of 8 hours per night. This is almost an hour more than the average. Moore, Jenkins, and Barker³ administered some 1,500 dynamometer tests to 26 women after varying amounts of from 6 to 9 hours sleep. They found that muscular performance is better with 9 hours than with 6 hours sleep. Barry and Bousfield⁴ reported that students feel better (euphoria) the next day after 8 to 8.75 hours sleep than they do when they sleep less than 6 hours or more than 9. Jenkins and Dallenbach⁵ found that subjects can retain memorized material better after 8 hours sleep than after 4, 2, or 1 hour of sleep.

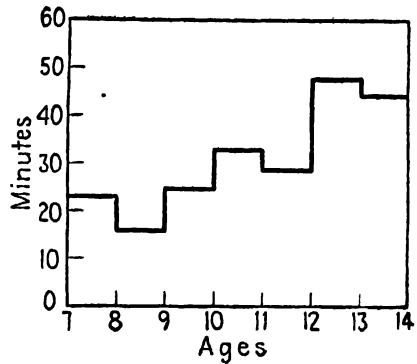


FIG. 5.—Minutes superior children sleep each day above the average for unselected children.

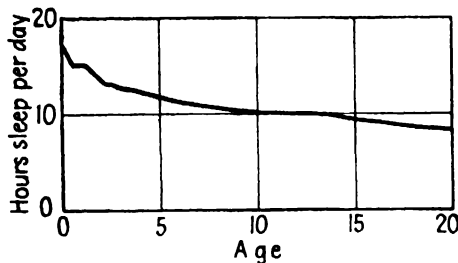


FIG. 6.—Decrease in total hours of sleep with increase in age.

There seem to be great individual differences in the duration of sleep, however. Kleitman found a range of variation of more than

¹ Terman, L. M., *Genetic Studies of Genius*, Stanford University Press, Stanford University, California, 1925.

² Laird, D. A., A Survey of the Sleep Habits of 500 Men of Distinction, *Amer. Med.*, 1931, **26**, 271-275.

³ Moore, L. M., Jenkins, M., and Barker, L., Relation of the Number of Hours Sleep to Muscular Efficiency, *Amer. J. Physiol.*, 1922, **59**, 471.

⁴ Barry, J., and Bousfield, W. A., A Quantitative Determination of Euphoria and Its Relation to Sleep, *J. Abnorm. Soc. Psychol.*, 1935, **29**, 385-389.

⁵ Jenkins, J. G., and Dallenbach, K. M., Oblivescence during Sleeping and Waking, *Amer. J. Psychol.*, 1924, **35**, 605-612.

3 hours in the average sleep duration of 25 subjects. After a series of experiments with 170 institutional children on factors affecting sleep motility, Renshaw, Miller, and Marquis¹ conclude that "the optimal amount of sleep for a child of a given age is an undetermined value." Whether necessary or not, some people certainly do sleep much more than do others.

It has been suggested that the duration of sleep is dependent on the depth of sleep. Deep sleep is supposed to have more recuperative effects than shallow or fitful sleep. One of the oldest studies of the depth of sleep was by Kohlschütter who plotted a depth-of-sleep curve by determining the amount of noise necessary to waken a person after various periods of sleep. By this method, the greatest depth of sleep seemed to come during the first 3 hours of sleeping. However, Kleitman found that the intensity of a sound necessary to waken a sleeper depends on "the period of immotility immediately preceding the test." If a subject has just recently moved in his sleep (*i.e.*, within 5 or 10 minutes), he is more easily wakened than after he has slept in the same position for a longer period of time (20 or 30 minutes). Because the average person moves more frequently during the latter part of the night, he would therefore be more easily wakened by noise at that time.

Many other methods have been used in the attempts to measure the depth of sleep. On the assumption that it is indicated by the ease of being wakened, pain, tactile, olfactory, and auditory stimulation have been used. These all give different depth-of-sleep curves. Based on still different assumptions regarding depth of sleep, brain waves, electrical skin resistance, body temperature, heart rate, blood pressure, the size of the pupil of the eye, have all been measured during sleep to determine its depth. There is no consistent agreement between these different methods of measurement. Consequently, no conclusions can be drawn regarding what part of the sleeping period is characterized by the greatest depth of sleep.

Another factor that is claimed to affect the rest value of sleep is continuity. Edison is reported to have slept but four hours during each diurnal cycle. However, as reported, this was in several short periods. The general opinion is that the best sleep is unintermittent. Husband² attempted to study this problem with, unfortunately, but one subject. The subject slept uninterruptedly for 8 hours every night for 1 month. During this time, and also during the following

¹ Renshaw, S., Miller, V. L., and Marquis, D. P., *Children's Sleep*, The Mac-Millan Company, New York, 1933.

² Husband, R., The Comparative Values of Continuous Versus Interrupted Sleep, *J. Exp. Psychol.*, 1935, **18**, 792-796.

month, he was tested every Saturday with a battery of mental and physical tests. Then, for a month, the subject slept from 11:00 P.M. to 2:00 A.M. and again from 5:00 A.M. to 8:00 A.M.—in all only 6 hours. There were no consistent differences between the two sleeping patterns in intellectual, motor, or physiological functions. Unfortunately, no conclusions can be drawn from this study because of its limitations.

So, in answer to the question—how much sleep is necessary?—we must conclude by saying that it is an individual matter and cannot be answered categorically. An Edison may need but 4 hours sleep, but John Doe may need 9 hours. Individual differences are too great to justify any generalizations regarding the necessary duration of a sleeping period or how frequently those periods should occur.

The Necessity of Sleep.—Can a person get along without any sleep at all and for how long before behavior and health are impaired? In 1896 Patrick and Gilbert¹ kept 3 subjects awake for 90 hours. Every 6 hours they were given simple tests (reaction time, tapping, memory of digits, memory of nonsense syllables, addition, and visual, auditory, and kinesthetic sensitivity). Observations were made of pulse rate, temperature, body weight, and urine composition. It was found that visual acuity improved during the awake period, although there was considerable eye pain. There was much less deterioration on the other tests than was expected. Complete normality, as indicated by the tests, was restored after 16 to 35 per cent of the lost sleep was made up.

Robinson and Hermann² studied the effects of the loss of sleep for a period of 60 hours on 3 subjects. The tests used were tapping, steadiness, hand grip, naming letters, and mental multiplication. They found no ill effects whatsoever. The authors themselves suggest, however, that the tests may have tapped “capacities comparatively uninfluenced by insomnia.” Furthermore, because of a feeling of lowered capacity, the subjects may have compensated by expending more effort. After a single night’s sleep the subjects reported that all feelings of “consequences of the insomnia had disappeared.”

Robinson and Richardson³ used a control group of 39 college students with which to compare the effects of the loss of 1 night’s sleep on another group of 25 college students. Various forms of the Army

¹ Patrick, and Gilbert, On the Effects of Loss of Sleep, *Psychol. Rev.*, 1896, 3, 469-183.

² Robinson, E. S., and Hermann, S. O., Effects of Loss of Sleep, *J. Exp. Psychol.*, 1922, 6, 19-32.

³ Robinson, E. S., and Richardson, R. F., Effects of Loss of Sleep, *J. Exp. Psychol.*, 1922, 5, 93-100

Alpha Test were administered before the sleepless period, after the sleepless period, and after 8 hours of sleep. The scores of both groups increased slightly due to the effects of practice, but there was no advantage in favor of the control group. Again, they suggest that the insomnia group may have compensated by expending extra effort. "The insomnia group, working under experimental conditions, took interest in the experimental situation after the sleep group, unaffected by the loss of sleep, had become relatively bored." The results of this study are shown in Table 30.

TABLE 30.—THE EFFECTS OF SLEEP LOSS ON INTELLIGENCE TEST SCORES

Group	Preceding sleep loss	After sleep loss	After one night's sleep
Control.....	161.00 \pm 2.00	170.5 \pm 1.7	171.5 \pm 1.7
Insomnia.....	160.2 \pm 3.2	168.1 \pm 3.0	168.4 \pm 3.7

One of the most recent studies of the effects of experimental insomnia was made by Edwards.¹ Seventeen college students were in the experiment group and 10 in the control group. Both groups were given a battery of 18 standardized psychological tests and six measures of physiological functions, 2 days before the loss of sleep, during the experiment, and 2 weeks after the sleepless period. In general, the results corroborate those of earlier investigations that the loss of sleep has but little detrimental effect though accompanied by obvious increase in effort.

There were no detrimental effects of the loss of sleep in reaction time, hand steadiness, hand grip, blood pressure, oral temperature, pulse rate, height, weight, vision, or patellar reflex. In static ataxia (maintaining upright balance) the experimental group swayed more as the loss of sleep increased. On the intelligence test (American Council on Education Test) after 24 hours without sleep, 13 did better (than 2 days before the experiment started) and 3 did worse; after 48 hours, 6 did better and 11 worse; and after 96 hours, 2 did better and 14 did worse. After 2 weeks of normal sleep, 16 did better and 1 did worse. There was also a deterioration of memory after 72 hours of sleep loss.

Twelve clinical symptoms appeared in the experimental group which, of course, were not obvious in the control group. They were as follows: dozing and falling asleep, irritability, inability to sustain

¹ Edwards, A. S., Effects of the Loss of One Hundred Hours Sleep, *Amer. J. Psychol.*, 1941, 45, 80-90.

attention, increasingly great effort required to perform various tasks, difficulty in maintaining equilibrium, alternate feelings of being very sleepy and then wide awake, increasing restlessness, extreme desire to be left alone, reduced ability to read and study, memory loss for very recent happenings, pseudohallucinations, and headaches. Other less common symptoms were irrelevant remarks, dizziness, speech difficulties, incorrect dressing, and seeing double.

There were four women in the experimental group and no sex differences were observed. However, the larger and more athletic individuals seemed to be affected by the loss of sleep more than the smaller and apparently weaker ones.

Conclusions from these and other comparable studies seem fairly clear. The human body can take a lot of punishment, as far as loss of sleep is concerned, and still function efficiently. However, the long-time effects on the body of prolonged insomnia are still in doubt. It is known that young puppies cannot withstand the loss of sleep longer than a week, even when fed artificially. There is "fatty degeneration in ganglion cells, capillary hemorrhages, and an increase of leucocytes." Crile¹ found that the loss of sleep produces changes in the central nervous system quite similar to those produced by starvation. After keeping rabbits awake for 96 to 118 hours he found lesions in the liver, the adrenal gland, and in the central nervous system. Perhaps the apparent freedom of detrimental results from the loss of sleep in human subjects is due to crude methods of measurements. At any rate, these experiments should not be interpreted as meaning that the college student can go without sleep for long periods of time without unknown (though unproved) detrimental results.

Motility during Sleep.—How often the statement is made—"I slept like a log. I didn't move all night. I was in the same position when I wakened this morning as I was when I went to sleep." This problem of motility during sleep has been rather extensively studied. Johnson² and his associates at Mellon Institute found, in some 15,000 measurements made on 11 students, that the average sleeper moves about once every 11.5 minutes during the night. They found that he moves every 5 minutes (or less) for 1.5 hours, every 10 minutes (or less) for 2.5 hours, and every 15 minutes (or less) for 3.5 hours. The frequency of the moves varies with the sleeper but not much from night to night. Some sleepers are habitually more active in sleep than

¹ Crile, G. W., *A Bi-polar Theory of Living Processes*, the Macmillan Company, New York, 1926.

² Valentine, W. L., Ed., Johnson, H. M., *Readings in Experimental Psychology*, Chap. 23, Harper & Brothers, New York, 1931.

are others. Also, some are more active during certain parts of the night than others. "Some sleepers tend to rest more during the first half of the night; others during the last half; and others during the middle."

TABLE 31.—THE EFFECTS OF VARIOUS FACTORS ON SLEEP MOTILITY

Factor	Effects		
Temperature and humidity....	No effects		
Age.....	Sleep motility increases with age		
Sex.....	Boys are more active during sleep than girls after the age of 10		
Seasons*.....	Winter is least active season for both boys and girls. Sleep motility is greater for other seasons		
	Season	Boys, per cent	Girls, per cent
	Winter.....	100	100
	Spring.....	104	124
	Summer....	110	140
	Autumn....	121	121
Moving pictures..	Motility increased for some children (60.5 per cent) and decreased for others (39.4 per cent) Young children (below ten) are less affected		
Sleep deprivation (up to 33%)	Decreased motility. Extends into several nights following deprivation Effects are greater for young children Boys are affected more than girls		
Coffee.....	Individual differences too great to permit generalization. (Motility increased for some children, decreased for others, and unaffected for others.) Double dosage does not double effects. Kaffee Hag causes more motility than coffee for some children		

* Working with 12 adult subjects over a period of four years, Kleitman found that sleep motility is least in the spring (100 per cent), more in the winter (111 per cent), more yet in the summer (130 per cent), and most in the autumn (150 per cent).

Kleitman¹ found that there is much more motility during the second half of the night than during the first, and that there is a relation between body temperature and motility during sleep. When the temperature is below normal, there are fewer movements than when the temperature is above normal. This would suggest that eating

¹ Kleitman, N., *Sleep and Wakefulness*, University of Chicago Press, Chicago, 1939.

before retiring, drinking stimulants (coffee, tea, etc.), intense excitement, or anything that would increase metabolism and hence body temperature would increase sleep motility.

Renshaw, Miller, and Marquis¹ studied the effects of moving pictures, change in season, experimental insomnia, and coffee on the motility of institutional children during sleep. The results are shown in Table 31.

It is now obvious that sleep is not motionless. No one position seems to afford maximum rest for all parts of the body. Movement is necessary to relieve the body of position tensions. While there is no rest value in the motion itself, the new position is more restful than the old one. Body rest seems to be a progressive affair. Thirty-five to 50 positions each night are necessary to afford the average sleeper rest for every part of his body.

The Control of Sleep.—From a practical standpoint, the college student is interested in two phases of the sleep problem—how to go to sleep and how to stay awake. There are times when he wants to sleep and cannot and other times when he wants to stay awake and cannot. If he has insomnia, he wants to be able to sleep without counting sheep, and if he has an examination, he wants to stay awake and study without that drowsy feeling which reduces his efficiency.

The fact that sleep can be induced is as old as civilization itself. The rocking cradle and the lullaby to induce sleep in children have been practiced by mothers for generations. However, modern mothers have learned that sleep is a habit that can be learned. They teach their children to go to sleep when put to bed. No special inducements are necessary other than those physical and physiological conditions that nature has decreed are conducive to sleep. These conditions produce sleep naturally and no supplemental methods are necessary. First is the need for sleep. No child will go to sleep immediately after he has awakened. Sleep comes naturally only when it is needed. Second, other physiological needs should be satisfied. A child will not go to sleep if he is hungry or thirsty or needs to go to the toilet. Third, the sleeping room should be darkened and as free from immediate noise as possible. There should be no sleep distractions. When these conditions are provided for the child, he soon forms a sleeping habit.

Now, what about the adult who has well-formed habits of sleeping and yet, sometimes is unable to do so? He tosses and turns and counts sheep and still cannot sleep. The first step in treating insomnia

¹ Renshaw, S., Miller, V. L., and Marquis, D., *Children's Sleep*, Macmillan Company, New York, 1933.

is to discover and remove the cause. Sleeping pills may produce sleep, but they will not remove the cause for sleeplessness. Insomnia is due to a wide variety of causes. Among them are the overuse of tobacco or coffee; overwork and overtension; overeating; disease; unusual physiological conditions (such as upset stomach, aching teeth, infection, etc.); sleeping room too hot or too cold; indigestion; eye-strain; pregnancy; tuberculosis; liver ailments; worry, etc. Whatever the cause, it must be removed in order to restore the person to his normal sleeping habits.

Even if the cause of insomnia is not removed, the person can lie in bed with deep relaxation and get almost as much value from his rest as he would from sleep. Cases have been reported of people who have lived for years without sleeping. Kleitman quotes Benon as reporting a case of insomnia of 17 years duration that "showed no dementia but only a melancholic depression." The loss of consciousness in sleep merely brings about the relaxation of a few speech muscles and sensory centers in addition to those that may be relaxed while still awake. Learning how to relax is not only important in getting the maximum values out of rest, but it is a good method of inducing sleep even when the cause of sleeplessness still exists. Relaxation always produces beneficial results, whether with sleep or without it. The importance of developing the technique of relaxation cannot be over-emphasized as a means of promoting rest. This is becoming even more important with the ever-increasing tempo of our modern civilized living.

There are a number of ways of inducing sleep, even when the causes for staying awake still exist, in addition to those already mentioned (rocking cradle, lullaby, pills, relaxation). Immotility, or lying perfectly still, is often effective. Many years ago, Sidis¹ was able to induce sleep in guinea pigs, cats, dogs, and children by limiting their movements and keeping their eyes closed. A monotonous sound will often induce sleep. The continuous tick of a clock, or the running of a motor, or the hum of electrical apparatus, acts somewhat as the mother's lullaby of the last generation. A drink of lukewarm milk or water is sometimes effective. (This does not mean hot coffee, or anything that will increase metabolism and body temperature.) Some people read themselves to sleep. This is very effective if the individual is already in a sleeping position. While a reclining position produces eyestrain, yet that very fatigue may be all that is necessary to induce sleep.

¹ Sidis, B., An Experimental Study of Sleep, *J. Abnorm. Psychol.*, 1908, 3, 1-32, 63-96, 170-207.

Much has been written about the importance of the bed, and especially the mattress, for restful sleep. There is no evidence that the type of mattress, whether hard or soft, has anything to do with the type of sleep. Some people form habits of sleeping on inner-spring mattresses, some on the ground, and some in swinging hammocks. As Kleitman says, "It is all a matter of individual likes and dislikes, and, except through suggestion, is of little importance in the quality of sleep produced."

Perhaps the most important factor in controlling sleep is regularity. If each day follows essentially the same pattern, the habit of going to sleep at a certain time is inevitable. Kleitman has found that a person's diurnal body temperature follows a definite pattern. His efficiency drops off as his temperature goes down. Consequently, his day should be patterned. He should eat at regular intervals, work during certain hours, eliminate waste products at definite times, and go to bed at a specified hour every night. Nature will then take care of the formation of habits. Then, when insomnia occurs, it will be due to unusual causes that can be discovered and eliminated.

The problem of how to stay awake is not so difficult as the one of how to go to sleep. Of course, both are products of nature and do not constitute problems in the normal healthy individual. If the student sleeps when he is tired and studies when he is rested, he does not have a problem of either insomnia or sleepiness. But, sleepiness sometimes comes even when the body is rested. A student who sleeps 8 hours per night may still be unable to stay awake to study for an examination in psychology. Experimental insomnia, with both humans and animals, indicates that activity or movement is most effective in keeping subjects awake. A brisk walk will brighten up a puppy even when it is near death from the effects of insomnia. Sleep is a cessation of the function of the higher cerebral centers. Obviously, it cannot occur while these centers are kept in a state of function.

Practical devices often used by students to stay awake are many and varied. A short walk around the block, vigorous calisthenics, drugs (including coffee), lowered temperature of the study room, maintaining an upright position, etc., are all used to repress sleep and induce wakefulness. Some students do better work, or so they think, by getting up early in the morning instead of studying late at night. If drowsiness is difficult to control, this is probably a better procedure. However, it would seem to be a better method yet to plan work so that the regular routine schedules of sleeping and studying do not interfere with each other. Then the law of nature—to sleep when tired and work when rested—will not be violated.

SUMMARY

Good scholarship and leadership in extracurricular affairs were found to be worthwhile objectives in college life. Both are highly correlated with success after college. While scholarship depends largely on native intelligence, it also depends on study habits that can be learned. These are

1. Intelligent planning and budgeting of time
2. Rapid reading with satisfactory comprehension
3. Intelligent note taking
4. Frequent review, whether for examination or not
5. Planning, organizing, and writing ideas in the form of themes, term papers, and reports

The problem of proper rest was found to consist of relaxation and sleep. Few people know how to relax and thus avoid much of the fatigue from being awake. Procedure for learning how to relax was explained. Sleep was found to be a complex problem that is not well understood, but on which there has been wide research. Some of this was reviewed and conclusions made when justified.

RECOMMENDED SUPPLEMENTARY READINGS

How to Study

- BENNETT, M. E.: *College and Life*, McGraw-Hill Book Company, Inc., New York, 1933.
- BIRD, C.: *Effective Study Habits*, D. Appleton-Century Company, Inc., New York, 1931.
- COLE, L., and FERGUSON, J. M.: *Student's Guide to Efficient Study*, Rinehart & Company, Inc., New York, 1935.
- CRAWLEY, S. L.: *Studying Effectively*, Prentice-Hall Inc., New York, 1936.
- FREDERICK, R. W.: *How to Study Handbook*, D. Appleton-Century Company, Inc., New York, 1938.
- ROBINSON, F. P.: *Diagnostic and Remedial Techniques for Effective Study*, Harper & Brothers, New York, 1941.

How to Rest

- JACOBSON, E.: *Progressive Relaxation*, University of Chicago Press, Chicago, 1938.
- JACOBSON, E.: *You Must Relax*, McGraw-Hill Book Company, Inc., New York, 1942.
- KLEITMAN, N.: *Sleep and Wakefulness*, University of Chicago Press, Chicago, 1939.

CHAPTER III

PSYCHOLOGY IN CHILD DEVELOPMENT

Original Nature

How the Child Inherits

The Nature of the Child at Birth

The Baby at Birth

Identical Twins Reared Apart

Foster Children Reared Together

Maturation

Physical Maturation

Mental Maturation

Distribution of Intelligence

The Constancy of the I.Q.

Personality Development

Emotional Life

Avoidable Conditions in the Home that Cause Annoying Emotions

Avoidable Conditions in the School that Cause Annoying Emotions

Interests and Attitudes

Children's Interests

Children's Attitudes

"What you are to be, you are now becoming," was the admonition a college president of the last generation gave to all entering freshman. While the implications of this statement are trite and obvious, it is too often the trite and obvious that are ignored. Certainly, the child is growing into an adult. Certainly, he is now becoming what he is later to be—so what? A subtle implication of the above statement, which probably escaped its author, is that the character and personality of the child are *determined* by his present and past actions. What the child becomes as an adult is positively and irrevocably produced by his childhood experiences. He is caused to be what he becomes. Adults cannot lift themselves by their bootstraps into desirable personalities by any hocus-pocus of will power, system of character formation, or religious experience—regardless of traditional and popular beliefs. What the child is to be, he is now in the process of becoming. When he arrives, there is nothing he can do about it. He cannot go back and live his childhood over again. Human character is the product of determining causes.¹

¹ Fortunately, character is always in the process of formation and can be altered constantly. The adult can change his personality by the same process by

No other principle of child guidance is quite as significant as this one. Society moulds its childhood into citizens—both good and bad. It is now forming its statesmen, educators, scientists, artists, engineers, and other constructive leaders of the next generation, as well as its murderers, drunkards, vagabonds, thieves, and criminals of various types. Both the good and bad citizenship of the future is now being molded side by side in our homes, schools, churches, and communities. Whether we like it or not, we are now making the bad citizens of the next generation as well as the good ones. Society is responsible for the nature of its citizenship.

ORIGINAL NATURE

One of the most difficult problems that science has ever attempted to solve is that of inheritance. However, speculation about the mechanisms of heredity has always been abundant. Even primitive people have ideas about how parents transmit certain characteristics to their children. But until the beginning of the present century, there was little scientific knowledge about the actual process of inheritance. Gregor Mendel published the results of his careful studies of crossbreeding different varieties of garden peas in 1866, but it was not until 1900 that his work received any attention in the scientific world. Since 1900, Mendel's laws of heredity have been carefully proved, and the processes by which they function have been discovered. Under the leadership of Thomas H. Morgan, hundreds of experiments have been performed in crossbreeding various plants and animals (especially a small insect called the fruit fly) which have led to a remarkably clear understanding of the details of heredity. This field of scientific investigation is called *genetics*.

HOW THE CHILD INHERITS

The geneticists have discovered that the egg (the ovum) of the female and the sperm of the male unite (at conception) and form a single cell, which is the beginning of a new organism. They have found that these two germ cells (the egg and the sperm) contain only half of the usual content of other body cells. In other words, the first cell of a new individual is formed by the union of two half-cells, one half-cell coming from the father and the other half-cell coming from

which it was formed—experience. The child forms personality habits through experience; the adult can change personality habits through experience. However, there is one significant difference. The child starts with nothing, or, as John Locke said, with a *tabula rasa*. He forms a new personality. The adult must alter an old one. He cannot start new.

the mother. The father and the mother each contributes exactly half of the heredity of the new individual. That is, all other cells in a human body contain 48 chromosomes while the egg and the sperm cells contain only 24 chromosomes each. When they unite, they then form a new cell of 48 chromosomes, 24 of which come from the sperm (the father) and 24 from the egg (the mother) (see Fig. 7).

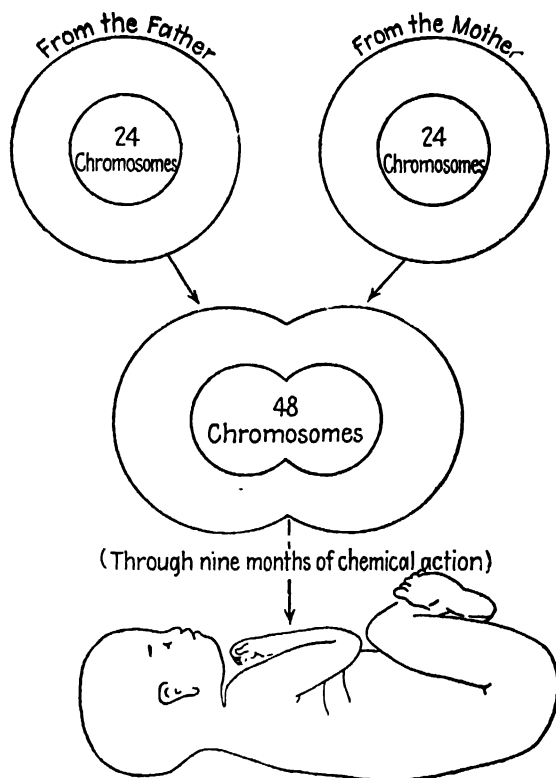


FIG. 7. — The development of a child.

When this process of fertilization has taken place (when the sperm and the egg have united) and the first cell of the new baby has been formed, the process of growth begins. There are four necessities for all organic growth—food, oxygen, water, and normal temperature. In birds, the food and the water are stored up in the egg, the oxygen is supplied through the porous shell, and normal temperature is furnished by the mother's sitting on the eggs. In human beings, however, the growth or development of the new baby takes place inside the body of the mother where food, oxygen, and water are absorbed from her blood,

and her temperature makes this factor normal. In other words, the human mother furnishes the four necessities for the growth of the new individual without interfering with her own usual behavior.

The process of growth consists of changing food and water into living matter through chemical processes. The chromosomes are made up of very small chemical packets called *genes* that work in pairs, one of each pair originally coming from the father and the other from the mother. It is through the chemical action of the genes that the raw products—food and water—are changed into body tissue. Oxygen and normal temperature are necessary conditions for this change.

When a certain amount of growth has taken place and the original cell has increased in size, it then divides into two cells. Each gene also divides so that there are exactly as many genes in each new cell as there were in the original cell. More growth takes place (*i.e.*, food and water are changed into living matter through the chemical action of the genes) and these two cells each divide again. This process is continued throughout the life of the individual. However, the cells soon begin to differ from each other, some of them becoming bone cells, some nerve cells, some blood cells, etc. These different kinds of cells become arranged after a certain pattern that is characteristic of the human organism. After about nine months, sufficient growth and development have taken place for the new baby to live outside the body of the mother. It is then expelled from her body, or it is born.

Before birth, the child received the four necessities for life—food, oxygen, water, and normal temperature—directly from the body of the mother. After birth, however, it gets oxygen through its own lungs, food and water through its own mouth (usually from the breast glands of the mother) and temperature from its own bodily processes. Birth is in no sense the beginning of life. The born child is essentially the same as it was before birth. About the only difference is that it is no longer inside the body of the mother. It is approximately 268 days old when it is born and is in no sense a new baby. Birth is merely an incident that takes place in the life of the child when he is about nine months old.

Now, just what does a child inherit? He inherits 24 strings of genes (called chromosomes) from his father and 24 strings of genes from his mother. Whether he has blue or brown eyes depends on whether he has gotten the genes that produce blue eyes or the genes that produce brown eyes. He will be tall or short, dark or light, bright or dull, male or female, etc., depending on what genes he has received from his parents. Children do not inherit physical character-

istics but only the genes that may produce those characteristics. However, the genes produce normal characteristics only if food, oxygen, water, and temperature are normal. The inherited genes of a child may be normal but if any one of these four necessities for life is abnormal, the child will be abnormal. Genes that would produce blue eyes may produce some other color, or no eyes at all, if the food, oxygen, water, or temperature of prebirth life is not normal.

Interesting experiments have been performed with some of the lower organisms such as flies, frogs, fish, and salamanders, which do not develop inside the body of the mother. The food, oxygen, water, and temperature have been varied from the normal, with the result that abnormal development has taken place. For example, when the temperature of the room in which fruit-fly eggs are being hatched is lowered, a queer abnormality develops. The flies have extra legs. When the humidity or moisture of the room is increased above normal, the shape of both the stomach and the eyes is abnormal.

A Mexican salamander or lizard lives normally in water. It has gill slits, paddlelike feet, and a flat tail suited for swimming. If a proper amount of iodine is placed in the water where this lizard lives, it undergoes great bodily changes, similar to those which a tadpole undergoes when it becomes a frog. The lizard loses its gills and develops lungs. Its paddlelike feet become adapted for crawling on land. Its flat swimming tail becomes round, and the animal ceases to live in the water and lives on land.

The number of eyes in both fish and frogs can be changed by bringing about certain changes in the environment. When the eggs of sea minnows are hatched in water containing magnesium chloride, the fish have only one instead of two eyes. When frog eggs are turned over at a certain stage of their development the tadpoles develop with two heads instead of one. Such partial twin formations may also be brought about in young fish by reducing the normal supply of oxygen.

All these experiments show that normal heredity will produce normal organisms only under normal prebirth environment. The inherited genes may be normal, but the new organism will be abnormal if the water, oxygen, food, and temperature are not supplied in a normal manner.

This means, then, that as far as the organism is concerned heredity and environment are so interconnected and interrelated that they are both necessary and equally important in producing physical characteristics. Heredity cannot function without environment and environment cannot function without heredity. Both are essential in producing the organism (see Fig. 8).

However, mammillary organisms (*i.e.*, those that suckle their young) are free from most of these extreme environmental changes during embryonic development because their young develop within the body of the mother. Food, oxygen, water, and temperature conditions are usually normal for this reason. When mammals are born with abnormal characteristics it may mean that they have received abnormal genes from the parents. But this is not always true. James X has an abnormally formed lower arm because before birth the umbilical cord became twisted around his arm and prevented its normal development. He did not inherit the abnormal arm, but it was produced by abnormal environment before birth. What we humans inherit depends on the conditions that exist while we are being formed.

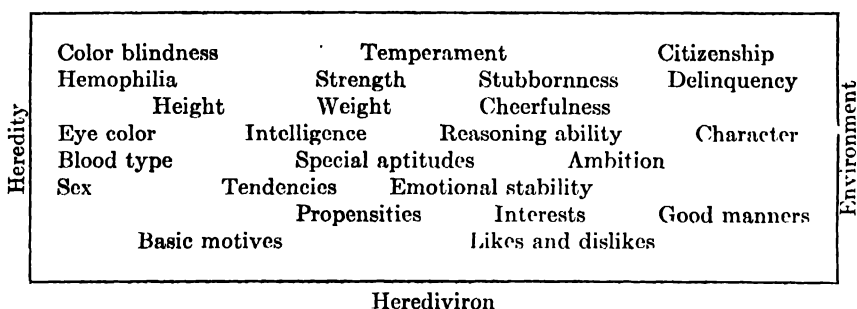


FIG. 8.—The interrelation of heredity and environment in producing personality traits. (Traits near the left extreme are influenced most by heredity and those near the right extreme most by environment.)

Commenting on this close relation of heredity and environment, Professor Jennings has said,

With the same set of genes, different environmental conditions may induce the production of diverse characteristics. And with the same environmental conditions, different genes may induce the production of diverse characteristics. The same difference in characteristics that may be produced in some cases by diversity of genes is in other cases produced by diversity of environment. There is then no thorough-going distinction in kind between diversities producible by gene differences, and those producible by environmental differences. Characteristics do not fall into two mutually exclusive classes, one hereditary, the other environmental. A given characteristic may be altered by changing the genes; and this is the ground on which it is called hereditary. But the same characteristic may be altered by changing the environment; and this is the ground on which it is called environmental. The genes supply one set of conditions for development, the environment another set, and there is no necessary difference in kind between them. The characteristic produced

may be changed by adequate alteration of either set. From the nature of a distinctive characteristic, it is not possible to decide whether it is due to diversity of genes or to diversity of environment, since the same peculiarity may be due in different cases to either set of causes.¹

"In the light of modern science, it now becomes necessary for us to modify the traditional conception of heredity and environment as being two distinct and separate forces, or sources, and think of them as amalgamated into *one* influence. No trait, either of behavior or of structure, can be attributed to inheritance exclusive of environment, or to environment exclusive of inheritance. The genes, or workmen, come by way of inheritance, but the environment, or the engineers and bosses, immediately assumes control of their behavior. There is a single rather than a dual source of organic structure. There is neither heredity nor environment, but the two in closest amalgamation—let us call it *herediviron*.

"However, the gene explanation of the formation of organic structure should not be interpreted to apply only to embryonic life. The process of body development before birth is fundamentally no different from the process of growth after birth. An organism's life begins at the moment of fertilization, and birth is only an episode in life. Cell mitosis, metabolism, gene behavior—all begin at fertilization and end only at death. Before birth, the organism gets its food (or raw cytoplasm) from the mother and is subjected only to her environment; after birth, the source of food supply changes and the environment becomes more diverse. However, the process of the genes transforming cytoplasm into body structure is the same throughout the life of the organism, and in no sense is birth the beginning of that life.

"Now, what is original nature from the standpoint of this biological explanation of organic growth? It is quite evident that there is no original nature in the sense of body structure. What is the original nature of an automobile? The iron ore (food) is transformed by factory workmen (genes) into the type of a machine (organic structure) which is determined by the factory draftsmen, engineers, foremen, machinery, and working conditions (environment). An automobile does not have an *original* nature. Neither does an organism. It would be better to ask, What is the physical *status quo* of an organism at birth, or at any other time in its life span? The answer would be, It is what its inherited genes have been able to make it under the con-

¹ Jennings, H. S., *The Biological Basis of Human Nature*, p. 134, W. W. Norton & Company, Inc., New York, 1930.

trol of its environment up to that time. Never should the question be asked, What is innate? Nothing is innate. No trait, physical or otherwise, is exclusively inherited. Inheritance and environment become amalgamated in organic life and each loses its identity. The influence of environment begins long before birth, in fact at the very moment of fertilization. The mother herself is only an environmental factor after conception. Her hereditary influence ceases, with the father's, when the ovum and spermatazoon unite. After that, she is merely a host to a distinct and organically separate individual. After birth, that host-parasite relationship is altered but not fundamentally changed.

"So we can say that the organism has no original nature any more than it has an 'acquired' nature. It is at any time in its life span a product of both heredity and environment in amalgamation. What an organism is, even before birth, is determined jointly by heredity and environment—*herediviron*."¹

THE NATURE OF THE CHILD AT BIRTH

Unquestionably, heredity sets certain limitations beyond which no amount of environmental training can go. Human genes cannot produce an organism that can live under water, nor one that can fly (without mechanical apparatus), nor one that can hibernate. Just being human carries certain hereditary limitations in comparison with other organisms. Then, within those hereditary limitations are all sorts of individual variations. Some of these are characteristic of races, some of families, and some of individuals. The genes of one race produce men of 70 in. in height, while those of another seldom produce men of over 65 in. in height. The genes of one family produce children of high intellectual aptitude, while those of another produce children of low intellectual capacity. The genes of one man may produce a body structure that can compose and play great music, while those of another produce structure that cannot discriminate harmony from discord. All environmental influence on human development is confined to the limitations of the inherited genes.

However, environment sets additional limitations. Inherited aptitudes are seldom developed to their fullest extent. In fact, it is doubtful if even the best environment offers sufficient opportunity for the fullest development of any innate capacity. In ordinary environment great innate aptitudes are often almost entirely undeveloped. Men with great musical capacities often spend their lives at menial

¹ The last four paragraphs are quoted from J. Stanley Gray, *Psychological Foundations of Education*, pp. 67ff. American Book Company, New York, 1935.

labor, and potential artists greater than da Vinci are never discovered. The great function of vocational guidance is to analyze a person's innate capacities and then guide him into work that makes use of those native advantages (see Chap. V for further discussion of this). In Fig. 9 the circle represents the greatest possible human inheritance. The outer polygon indicates the inherited capacities of John Doe. The inner polygon represents the abilities of John Doe as they have been developed up to the present time. Whether inherited aptitudes are great or small, their development depends on the opportunities of environment.

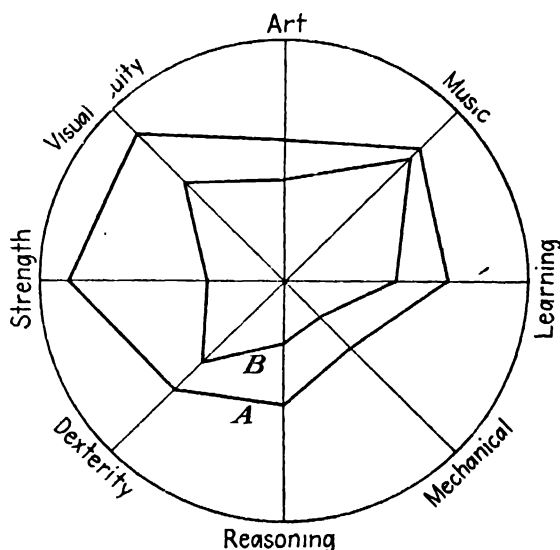


FIG. 9.—The relation of the inherited potentialities or aptitudes (A) to the developed abilities (B) of John Doe.

Because the human child develops within the body of his mother and therefore is subjected to a fairly stable prebirth environment, we can assume that the differences in children at birth are largely due to differences in inherited genes. Furthermore, if we are careful to keep the postbirth environment of two or more children the same as far as possible, we can assume that differences that develop are due largely to different genes. Likewise, if we vary the postbirth environment of two children known to have identical genes, such as identical twins, we can assume that differences that develop are due to environment. In other words, even though heredity and environment are amalgamated in human structure, the relative influence of each can be studied in three ways—by studying neonates, or babies at birth; by

studying identical twins reared apart; by studying unrelated children reared together. Space permits only a brief introduction to the research on these topics.

The Baby at Birth.—The study of human neonates is limited by their frailness and restricted behavior. They do little but vegetate and in this respect are not essentially different from neonates of other species, especially those that are also undeveloped at birth. (The human neonate has undergone a lower percentage of his mature development than that of any other animal. He also has a longer period of infancy.) Jordan¹ has listed a set of traits that he labels as "probably inherited." He recognizes that "heredity and environment cooperate in producing any and all structure which appears."

1. Traits which appear at birth or soon thereafter.

A. Reflexes

1. Those which are aroused by stimuli within the organism itself.
 - a. Sneezing
 - b. Crying
 - c. Hiccoughing
 - d. Yawning
 - e. Urination and defecation
2. Those which are aroused by stimuli from outside the organism.
 - a. Withdrawing and defense movements
 - b. Rejecting—such as unpleasant tastes
 - c. Grasping
3. Those which are aroused by stimuli sometimes within the body and sometimes outside the body.
 - a. Head movements
 - b. Hand movements
 - c. Arm movements
 - d. Leg and foot movements
 - e. Smiling

B. Sources of language and skill

1. Vocalization
2. Manipulation
3. Visual exploration

C. Organic responses

1. Food getting—begins with sucking
2. Thirst
3. Emotion—both pleasant and unpleasant

¹ Jordan, A. M. *Educational Psychology*, pp. 44ff., Henry Holt & Company, Inc., New York, 1942.

II. Traits which appear after maturation of nerve, gland, or muscle.**A. Those much dependent on heredity**

1. Blinking
2. Walking
3. Sex behavior

B. Those less dependent on heredity

1. Mastery—desire to control one's environment
2. Rivalry—desire to surpass another or one's own past record
3. Fighting—often an effect of the desire for mastery

However, regardless of what is inherited and what is not, it is more important to the psychologist to know which human wants and desires are immutable and which can be altered by training. For example, is the want to own property an innate and immutable want or is it the product of social training? Is mother love somehow innate in the germ plasm, or is it a cultural pattern? The following classification of human wants is based on wide research which cannot be reviewed in limited space.

I. Basic or primary wants—those that are present in all humans regardless of variations in culture

- A. Organic needs**—wants for food, water, air, comfortable temperature, etc.
- B. Sex pleasure**—becomes more intense at puberty
- C. Maternal love**—due to hormones produced by the physiological condition of motherhood
- D. Activity**—want to release stored up energy
- E. Rest**—want to recuperate from activity
- F. Regurgitate or vomit**—due to disgusting sensations
- G. Avoid pain, illness, and death**
- H. Avoid interference**

II. Derived or secondary wants—those that are learned but vary little with culture, due perhaps to certain common characteristics in human cultures

- A. Emotional excitement**
- B. To be with others**
- C. To be liked by others**
- D. To control one's environment**—includes ownership
- E. To follow leaders**
- F. To explore**
- G. To compete with others**
- H. To worship**

III. Individualistic wants—those that have been learned and are peculiar to individuals. These are too numerous to list.

The strength of a want does not depend on whether it is basic, derived, or individualistic. A learned individualistic want may become stronger than an unlearned basic want.

Basic wants should be recognized and accepted as inevitable. It is foolish to try to change them or to ignore them. Any derived wants can be changed, although when they are approved by cultural standards change is difficult. Information as to which human wants, or motives, are changeable and which are instinctive has a determining effect on child training.

Identical Twins Reared Apart.—Identical twins always develop from the same original cell. After the first mitosis, for some unknown reason, the two cells become separated and two children develop instead of one. Their heredity is therefore identical, they are of the same sex, and develop before birth in the same chorion. They usually grow up together and are very much alike in both looks and actions.

Since identical twins have identical heredity, when they are reared in separate homes any differences that appear are then properly attributed to environment. Such cases are few and are reported in the literature as case studies. Muller¹ reports the case of identical twin girls who were reared apart from the time they were two weeks old. At the time of the study they were thirty years old. One completed the twelfth grade and had taught school. She was married and had one child. The other attended school only four years, was unmarried, and at the age of thirty was actively engaged in a minor business. Both were energetic, popular, and active in community affairs. On intelligence tests the twins obtained very similar scores. They made raw scores of 156 and 153 on the Army Alpha, and 64 and 62 on the Otis Advanced Test of Intelligence. "Marked differences were found, however, on personality tests, speed of free association, and tests of motor speed and coordination. The differences were in general such as would be expected from the variations noted in their environments."

Newman² has studied 19 pairs of identical twins reared apart and compared them with 50 pairs of identical twins reared together. He was very careful to establish the fact of identity by comparing finger prints, shape of teeth, and general appearance. A comparison of the differences between the identical twins reared together and those reared apart is shown in Table 32. Note that differences in weight, I.Q., and educational achievement are significant whereas other differences are not.

¹ Muller, H. J., Mental Traits and Heredity, *J. Hered.*, 1925, **16**, 433-448.

² Newman, H. H., Freeman, F. N., and Holzinger, K. J., *Twins: A Study of Heredity and Environment*, University of Chicago Press, Chicago, 1937.

TABLE 32.—MEAN DIFFERENCES FOR TWO GROUPS OF IDENTICAL TWIN PAIRS

Traits	Reared apart	Reared together	Diff.	P.E. <i>d</i>	Diff. P.E. <i>d</i>
Height.....	1.8	1.61	.19	.31	.6
Weight.....	9.9	4.03	5.87	1.22	4.8
Head length.....	2.2	2.59	-.39	.42	.9
Head width.....	2.85	2.25	.6	.4	1.5
Binet I.Q.	8.21	5.35	2.86	.95	3
Otis I.Q.	8	4.54	3.67	.89	4.1
Stanford Achievement	16.26	6.38	9.88	1.91	5.2
Woodworth-Mathews.....	5	5.48	-.48	.93	.5

In many cases one twin was reared in an environment that was vastly superior to that of his mate. Newman tried to discover the relation of the magnitude of the differences in traits to the magnitude of differences in environment. He rated each separate environment on three factors—educational, social, and physical characteristics. Differences in these ratings were then correlated with twin differences

TABLE 33.—CORRELATION OF TWIN DIFFERENCES ON CERTAIN TRAITS WITH ESTIMATED DIFFERENCES IN THREE ENVIRONMENTAL RATINGS

Traits	Environmental difference rating		
	Educational	Social	Physical
Height.....	-.015	-.005	-.175
Weight.....	-.095	.226	.599
Head length.....	-.139	-.256	-.102
Head width.....	-.024	.15	-.352
Cephalic index.....	.105	.154	-.375
Binet I.Q. ....	.791	.509	.304
Otis I.Q. ....	.547	.533	-.225
International Test..	.462	.534	-.026
American Council Test	.57	.321	.082
Stanford Educational Age	.908	.349	.139
Woodworth-Mathews.....	.044	-.075	-.291
Kent-Rosanoff:			
Common reaction.....	-.218	.102	-.342
Frequency of response.....	-.272	.014	-.128
Pressey Emotions:			
Number crossed out.....	.249	-.418	.124
Number deviations.....	.221	.349	-.183
Downey Will-Temperament:			
Total score.....	.411	.271	.465
Pattern difference..	.435	.021	.142

on traits. These results are shown in Table 33. Note that educational and social factors in environment are very significant in mental and educational tests but most other correlations are too low to be significant.

It is obvious from these tables that environmental differences affect some traits more than others, and, from data not here shown, it is obvious that these differences affect some twins more than others. The small number of cases, however, makes any conclusions tentative.

Foster Children Reared Together.—When unrelated children are reared together any increase in similarity above the average (*i.e.*, correlation greater than zero) may properly be attributed to environment. Burks¹ studied a group of 214 adopted children in comparison with a control group of 105 children who were living with their natural parents. The control group was matched with the foster group in age of children; age, occupation, education, and social status of parents; and the cultural level of the home. The Stanford-Binet Intelligence Test was given to the parents and children of both groups and correlations computed between parents and children. Another study that followed the same pattern was performed by Leahy.² He used 194 children in each group, experimental and control. His results were quite similar to those of Burks. The data of both are given in Table 34.

TABLE 34.—CORRELATIONS BETWEEN THE INTELLIGENCE OF CHILDREN AND THAT OF THEIR PARENTS

	Burks data		Leahy data	
	Foster	Control	Foster	Control
Father and child . . . . .	.07	.45	.19	.51
Mother and child . . . . .	.19	.46	.24	.51
Cultural index of home . . . . .	.25	.44	.26	.51

Both authors conclude that heredity is much more important than environment in determining the ability to do well on our intelligence tests. Burks says, "The maximal contribution of the best home environment to intelligence is apparently about 20 points, and almost surely lies between 10 and 30 points."

¹ Burks, B. S., *The Relative Influence of Nature and Nurture*, 27th Yearb., *Nat. Soc. Stud. Educ.*, 1928, Part I, 219-316.

² Leahy, A. M., *Nature-nurture and Intelligence*, *Genet. Psychol. Monogr.*, 1935, 17, 236-308.

Freeman¹ studied three groups of foster children to find the effects of home culture on intelligence. The children in Group I were given intelligence tests before adoption and again several years after adoption. Forty-one of them were placed in homes of low cultural levels and 33 were placed in homes of higher cultural levels. The children in the better homes gained 5.3 I.Q. points while those in the poorer homes made no gain at all. However, it was found that children who were adopted into better homes after the age of twelve made no gains.

Group II consisted of 125 pairs of siblings who were adopted into different foster homes. They were found to correlate only .25 on intelligence tests whereas siblings in natural homes correlate .50. Those sibling pairs who were adopted in homes of similar cultural levels correlated .30 while those who were adopted into homes of significantly different cultural levels correlated only .19.

The third group studied were children adopted into homes where there were other children, either natural or also adopted. There were 112 pairs of such foster siblings. The correlation here was .35 as compared with .50 for natural siblings in the same home.

For the entire group of children studied, there was a correlation of .48 between I.Q. and the cultural level of the home, of .37 between the foster child and the foster father, and of .28 between the foster child and the foster mother.

What, then, is the nature of the child at birth? He is a developing organism that has certain hereditary limitations beyond which development cannot go, and he has certain hereditary potentialities that may be developed *if* his environment (home, school, neighborhood, etc.) is appropriate for that development. Consequently, any test of his ability (either mental or physical) will be affected by both his hereditary potentialities and the degree to which his past environment has nurtured those potentialities. Obviously, the proper function of the home, the school, and the neighborhood is to provide for the greatest development of the native potentialities of every child.

MATURATION

It is characteristic of the human neonate (like that of any other newborn organism) that he functions as a coordinated mass of protoplasm, or as a whole. This is called "organismic function," as distinguished from inorganic "elementalistic function" where each unit or part is capable of functioning alone. The neonate cannot move a finger or toe alone; he must move his entire body. This movement

¹ Freeman, F. N., Holzinger, K. J., and Mitchell, B. D., *The Influence of Environment*, 27th Yearb., *Nat. Soc. Stud. Educ.*, 1928, Part I, 103-217.

is head-centered and diffuses to other parts of his body.¹ As he grows older he becomes able to localize this behavior into a certain part of his body. Localized leg movements develop into walking, localized hand movements develop into writing, localized tongue movements develop into talking, etc. Maturation is a process of localizing and differentiating movements from immature gross total patterns into specific and more delicate patterns.

Maturation should be distinguished from learning. The end result of both is the establishment of behavior patterns, but maturation patterns are somehow inherent in the germ plasm while learning patterns are definitely inherent in environmental conditions. Maturation follows certain patterns regardless of environmental variations. Learning follows those patterns that are determined by environmental variations. A child will become adolescent, or attain the same height, or see with the same acuity, whether he lives in the torrid or the frigid zones, whether he lives in the city or the country, whether his parents are rich or poor, whether he goes to school or works in a factory, in short, regardless of his environment. But, a child will learn to speak English, or French, or Russian, depending on early environment. He will learn to operate a typewriter, or play the piano, or drive an automobile, or draw the plans for a building, if his environment trains him in such behavior patterns. Therefore, it is important in rearing children to know which behavior patterns are the result of maturation and which ones are learned.

PHYSICAL MATURATION

When a behavior pattern develops, or matures, it may involve any one or any combination of the following factors—accuracy or precision, speed, steadiness, and strength. A certain degree of development in all four factors is necessary for any behavior but the amount of each varies greatly with the type of behavior. Piano playing requires considerably more accuracy and speed but less steadiness and strength than working as a steeple jack, for example. Billiard playing requires great precision, speed, and steadiness but not much strength. Torch welding requires steadiness and precision but neither speed nor strength. Then, individuals differ greatly in their propensities in these four behavior factors. Some are naturally strong but lack the factors of accuracy, speed, and steadiness. Others are highly accurate, others are very fast, and others excel in steadiness.

¹ See Irwin, O. C., *The Amount and Nature of Activity in New Born Infants*, *Genet. Psychol. Monogr.*, 1930, 8; and Coghill, G. E., *Anatomy and the Problem of Behavior*, The Macmillan Company, New York, 1929.

Psychologists have developed apparatus for measuring each of these factors. Dynamometers measure strength, tracing boards measure steadiness and accuracy, a telegraph key and Veeder counter measure speed, and various pegboards and assembly tests measure all these factors in combination. Tables of norms for each of these factors have been developed for children of different ages.¹

Physical maturation is not uniform in the developmental life of the child, nor is it uniform between children. Figure 10 illustrates the

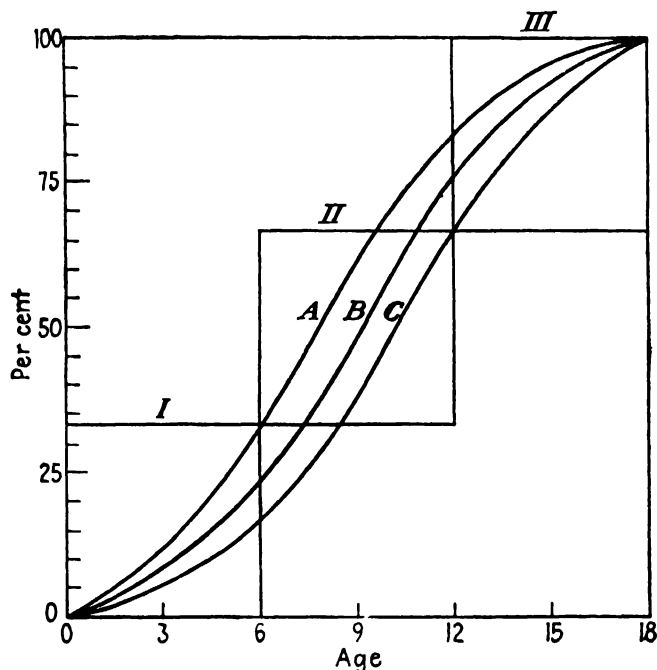


FIG. 10.—Showing accelerated (A) normal (B) and retarded (C) patterns of maturation.

patterns of maturation of three children. Note that they are all equally mature at the age of eighteen, but at any previous age A is precocious and C is retarded. All three children develop rapidly during a period between childhood and adulthood, although they vary in the age boundaries of this period. At age six, for example, A has undergone 34 per cent of his maturity, B has undergone 25 per cent of his maturity, and C has undergone but 17 per cent of his maturity. It is always difficult to determine whether an atypical child is maturing atypically or has atypical heredity.

¹See Brace, D. K., *Measuring Motor Ability*, A. S. Barnes & Co., New York, 1927.

Note that Fig. 10 tells the entire story of maturation from fertilization to complete maturity. Often only segments of maturation are studied. Suppose that the maturation of *A* is studied between the ages of six and nine. Only that part of the curve contained in box II would then be shown. A complete maturation curve is always S-shaped.

Physical maturation also varies greatly between bodily organs within the child himself. Figure 11 shows the average pattern of maturation in the average child for four divisions of body organs, or organic systems. Note that the lymph system reaches greatest maturity at the age of twelve, which is 190 per cent of its maturity

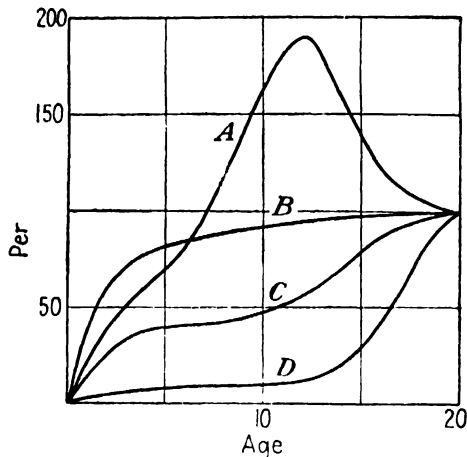


FIG. 11.—Maturation patterns of various body organ systems *A*, lymph, *B*, neural, *C*, muscles and bones, *D*, sex.

at the age of twenty. On the other hand, the sex system is still relatively dormant at the age of twelve. Of course, there are accelerated and retarded patterns of development for each of these organic divisions. Some children begin sex maturation (puberty) at the age of ten and others at the age of sixteen. Individual differences between children, as suggested in Fig. 10, also exist in each of the four patterns of maturation shown in Fig. 11.

Patterns of maturation vary between the sexes. Girls mature more rapidly after the age of eight than do boys. Figure 12 shows the age at which boys and girls become pubescent. At the age of twelve, for example, 30 per cent of the girls and only 10 per cent of the boys are pubescent. At the age of fifteen, 84 per cent of the girls and 66 per cent of the boys have become pubescent. When weight and height are

plotted in terms of percentage at age eighteen, the curves are quite like those in Fig. 12.

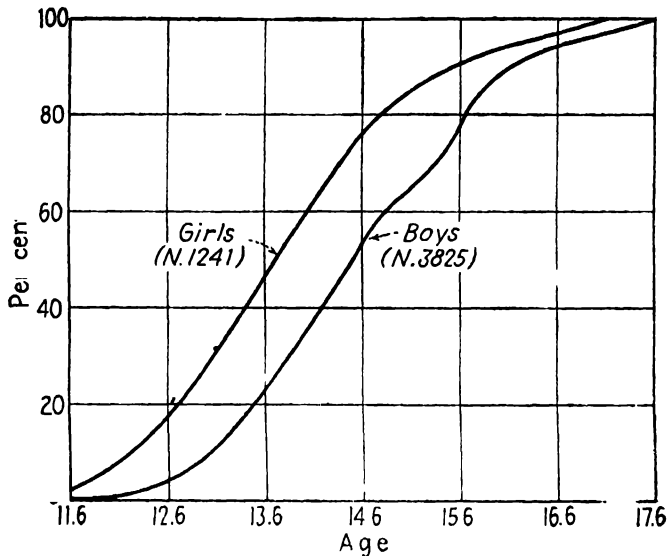


FIG. 12.—Age of pubescence of boys and girls.

Norm tables of physical maturation have been constructed from studies of the development of large groups of children. Two of these are reproduced in Tables 35¹ and 36². Variation from these norms

TABLE 35.—NORMATIVE SUMMARY FOR WALKING

Activity	Normal Age Range, Weeks
Lifts head momentarily when on stomach	4-8
Raises upper chest when on stomach	16-36
Sits with body erect, supported	20-28
Sits with slight or no support	20-32
Sits one minute or more	32-40
Rolls from back to stomach	32-40
Sits for indefinite period	40-56
Crawls	40-52
Creeps	44-56
Stands only when both hands are supported	36
Pulls to standing position	48-56
Stands independently without support	56
Walks using support	48-56
Walks independently	56

¹ From Gesell, A. and Thompson, H., *The Psychology of Early Growth*, The Macmillan Company, New York, 1938.

² From Bayley, N., 'The Development of Motor Skill during the First Three Years, *Nat. Res. Council. Monogr.* I, 1935.

does not always mean that a child is innately handicapped. As indicated in Table 35, a child may be retarded in physical development for a few years and yet be perfectly normal at the adult level. However, variations from normal physical development should be watched carefully for other indications of hereditary handicap. Children with inferior heredity do mature more slowly than do normal children.

TABLE 36.—THE CALIFORNIA INFANT SCALE OF MOTOR DEVELOPMENT

Activity	Age, Months
Head erect—vertical	1.9
Head erect and steady	2.9
Turns from side to side	3.4
Sits with support	3.5
Holds head steady	3.6
Beginning thumb opposition	4.1
Sits with slight support	4.6
Turns from back to side	5
Partial thumb opposition	5.1
Sits one momentarily	5.7
Pulls to sitting position	6.2
Rolls from back to stomach	7
Complete thumb opposition	7.6
Partial finger prehension	7.8
Sits alone with good coordination	8.5
Fine prehension with pellet	9.3
Raises self to sitting position	9.4
Pulls to standing position	10.5
Stands up	10.6
Walks with help	11.6
Sits down	12.5
Stands alone	12.5
Walks alone	13
Walks upstairs with help	20.3
Walks downstairs with help	20.5
Walks upstairs alone; marks time	24.3
Walks downstairs alone; marks time	24.5
Jumps off floor; both feet	28
Stands on one foot alone	29.2
Walks upstairs alternating forward foot	35.5
Walks tiptoe 3 meters	36.2
Jumps from height of 30 cm	37.1
Distance jump, 36–60 cm	39.7
Hops on right foot less than 2 meters	49.3

MENTAL MATURATION

The pattern for mental maturation is much like that for physical maturation. Normal variations occur similar to those shown in Fig. 10. Also, variations occur within the child himself in the patterns of

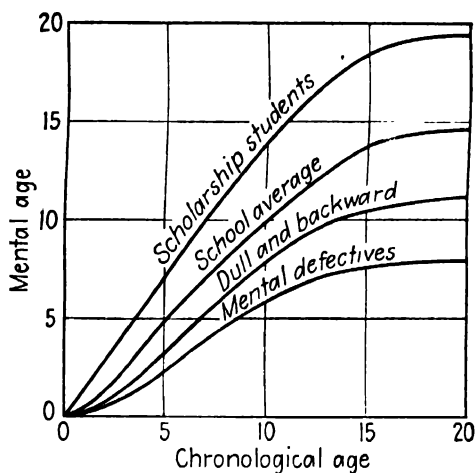


FIG. 13.—Mental development of superior, average, dull, and defective children

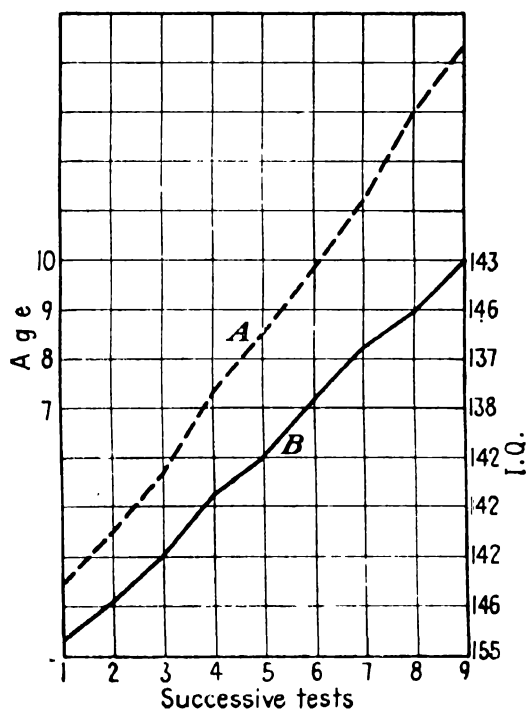


FIG. 14.—Mental age (A) of a child at successive chronological ages (B).

maturation of the various mental traits, similar to the variations of physical traits illustrated in Fig. 11. When a large number of mental traits are taken together, such as those measured by intelligence tests, the pattern of maturation is then an average of that for all those traits. Figure 13 shows the patterns of mental development for children of superior, average, and inferior mental aptitudes. Note that mental differences become more pronounced as the children get older. The reason is that mental tests measure the effects of an aptitude functioning in its environment. These effects are cumulative so that a limited aptitude in a limited environment, or a superior aptitude in a superior environment becomes more obvious in measurement. This same effect is apparent when an individual child is tested successively over a period of time. Figure 14 shows the results of successive tests given approximately a year apart to a child who was two years old at the first test and ten at the last one. The distance between his mental age and his chronological age becomes ever greater. However, note that the I.Q. remains fairly constant.

The two problems suggested in the preceding paragraph—the distribution of intelligence and the constancy of intelligence—are of sufficient significance for further attention.

TABLE 37.—THE FREQUENCY OF I.Q. LEVELS AMONG 11,321 HIGH-SCHOOL SENIORS

I.Q.	Number
131	32
126	186
121	411
116	821
111	1,313
106	1,786
101	2,110
96	1,921
91	1,382
86	767
81	357
76	153
71	51
66	24
61	7
Mean 103.4	Total 11,321

The Distribution of Intelligence.—Like any other trait in nature, intelligence is distributed in a normal manner if enough cases are considered. Odell¹ measured the intelligence of 11,321 high-school

¹ Odell, C. W., Are College Students a Select Group?, *Univ. Ill. Bull.*, 1927, Vol. 24, No. 36.

seniors and found that even in this select group there was a fairly symmetrical distribution. The results are shown in Table 37.

Pressey and Robinson¹ summarized a mass of research and interpreted it in a table showing the distribution of children at each I.Q. level, the adult mental-age equivalent, the more popular classification terminology, and the academic and vocational possibilities. This summary is reproduced in Table 38.

TABLE 38.—INTELLIGENCE LEVELS AND THEIR SIGNIFICANCE

I.Q.	Per cent	Adult M.A.	Classification	Academic possibility	Vocational possibility
140 up	.6	21 up	Very superior	Graduate	Professional, executive
120-139	9.9	18 -21	Superior	Technical	Professional, technical
110-119	16	16.5-18	High average	College	Technical, business
90-109	47	13.5-16.5	Average	High school	Clerical, skilled
80- 89	16	12 -13.5	Low average	9th grade	Semiskilled
70- 79	7.5	10.5-12	Inferior	7th grade	Routine work
60- 69	2.4	9 -10.5	Borderline deficient	5th grade	Unskilled labor
50- 59	.5	7.5-9	Deficient	3rd grade	Simplest labor
Below 50	.1	Below 7.5	Very deficient	Special class	Unemployable

The Constancy of the I.Q.—Mental age is obtained by giving a child a mental test and then comparing his score with that made by a large number of other children. If his score is the same as that made by children who are seven years and six months old (ninety months), let us say, he is then considered to have a mental age of seven years and six months. Now, if his chronological age is also seven years and six months, a quotient obtained by dividing his mental age by his chronological age will be exactly 100. (The decimal point is always dropped.) It is obvious that if his mental age had been greater than his chronological age, the quotient would have been greater than 100. Or, if his mental age had been less than his chronological age, the quotient would have been less than 100.

If the child develops mentally at exactly the same rate as other children tested (from which a table of norms has been constructed by which all test scores are interpreted into equivalent mental ages)

¹ Pressey, S. L., and Robinson, F. P., *Psychology and the New Education*, p. 89, Harper & Brothers, New York, 1944.

his I.Q. will remain constant. However, if his mental development is faster than that of other children, his I.Q. will increase. Likewise, if his mental development is slower than that of other children, his I.Q. will decrease.

Thorndike¹ has found that in 1 year the average variation in I.Q. is 5.32 points and in 9 years it is 9.34 points. Therefore, variations of no greater than these averages, regardless of the conditions, must be expected.

Wellman and a group of her associates at the University of Iowa have amassed a body of data indicating that in atypical environment the I.Q. will vary significantly more than the average. The longer the child remains in that environment the more its I.Q. will become typical of that cultural level. Gordon² found as long ago as 1923 that English children living on canal boats and gypsy children apparently become less intelligent as they grow older. He found a correlation of $-.75$ between intelligence and age for canal-boat children and $-.57$ for gypsy children. Speer³ found that this is likewise true of the children of feeble-minded mothers. The older the children of feeble-minded mothers, the nearer they approach their mothers in I.Q. Speer's data are shown in Table 39.

TABLE 39.—THE I.Q. OF CHILDREN OF FEEBLE-MINDED MOTHERS

Age of child	<i>N</i>	Median I.Q.
— 2	12	100.5
3— 5	19	83.7
6— 8	12	74.6
9—11	9	71.5
12—15	16	53.1

Barrett and Koch⁴ studied the effects of nursery-school environment on a group of orphanage children in comparison with a control group (matched as to age, sex, and mental age) that did not attend nursery school. The mean I.Q. of the nursery-school group increased

¹ Thorndike, E. L., The Effects of the Interval between Test and Retest on the Constancy of the I.Q., *J. Educ. Psychol.*, 1933, **24**, 543-549.

² Gordon, Hugh, Mental and Scholastic Tests among Retarded Children, *London Bd. Educ. Pamph.* 44, 1923.

³ Speer, G. S., The Mental Development of Children of Feeble-minded and Normal Mothers, *39th Yearb. Nat. Soc. Stud. Educ.*, 1940, Part II.

⁴ Barrett, H. E., and Koch, H. L., The Effects of Nursery School Training upon the Mental Test Performance of a Group of Orphanage Children, *J. Genet. Psychol.*, 1930, **37**, 102-122.

20.9 I.Q. points, whereas that of the control group increased only 5.1 points. Wellman's series of studies¹ substantiates these results.

Studies of children in isolated mountain regions of Kentucky, Tennessee, Georgia, and Virginia all report that there are progressive decreases in I.Q. with advancing chronological age. The results of two of these studies are shown in Fig. 15.²

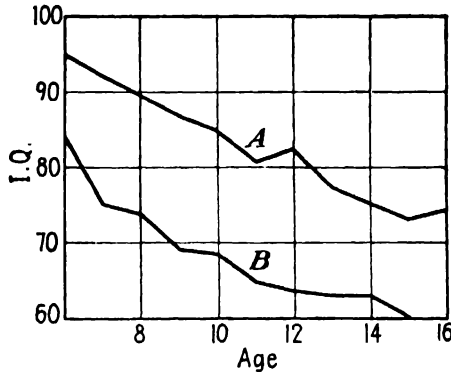


FIG. 15.—The I.Q. of isolated mountain children at various ages. A. Tennessee, B. Kentucky.

On the other hand Terman, Goodenough, Anderson, and others disagree that the I.Q. is so subject to environmental variations. Much of the confusion is due to the use of the term “intelligence.” When intelligence means mental limitations as determined by innate germ plasm, it is obvious that no environmental conditions can effect it. Heredity is fixed from the moment of fertilization. However, when intelligence means the results on mental tests and is interpreted by tables of norms established by testing other children, it is obvious that environmental variations will affect the results. The need for further research and more careful thinking about this problem is obvious.

PERSONALITY DEVELOPMENT

Personality is the sum total of the ways a person affects other people. The rating of a personality is determined by what acquaintances think about a person's habits, ideas, ideals, appearance, etc.

¹ These are reviewed in the 39th Yearb., Nat. Soc. Stud. Educ., Chap. 26, 1940, Part II.

² Asher, E. J., The Inadequacy of Current Intelligence Tests for Testing Kentucky Mountain Children, *J. Genet. Psychol.*, 1935, **46**, 480-486.

Wheeler, L. R., The Intelligence of East Tennessee Mountain Children, *J. Educ. Psychol.*, 1932, **23**, 351-370.

If they are attracted by a person, he is said to have a good personality. If they are affected adversely, he is said to have a poor personality. "How to win friends and influence people" is another way of saying "How to develop a good personality."

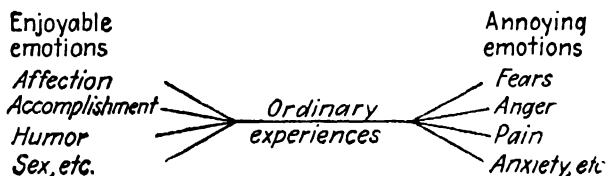
The child is constantly forming habits of doing things that eventually will affect other people favorably or unfavorably. He is forming his personality. Of course, he does not realize this, and seldom do his parents. Personality is the by-product of living. It is constantly developing and more and more becoming fixed. The pattern of adult personality is usually fairly well fixed by the age of ten. Even in the first two years, behavior patterns are formed that are recognizable on adult levels.

Some personality factors are definitely learned (habits, ideas, ideals, attitudes, interests, etc.) and others are more limited by heredity (complexion, stature, physiological reactions, limits of learning, etc.) However, within hereditary limitations any child can develop a good or a poor personality depending on his cultural environment (home, school, neighborhood, etc.)

EMOTIONAL DEVELOPMENT

The word *emotion* refers to almost any kind of behavior that is unusual or out of the ordinary. Routine experiences of daily living are not usually emotional. They provoke neither enjoyment nor annoyance. There is no overstimulation nor consequent feeling of pleasure or displeasure. However, episodes arise that cause the person to experience emotion, even though there may be no outer manifestation of it. Emotion is always accompanied by an inner feeling and usually by some sort of outer or overt expression of it.

Emotions are of two opposing types—enjoyable and annoying. The young child indicates the presence of the former by laughing and the latter by crying. As he grows older he modifies this behavior as determined by his experience and training. The following graph illustrates these two opposing classifications.



Children (and adults) differ greatly in their susceptibility to emotional stimulation. Some become emotional easily, and there-

fore frequently, while others are more stable. Some feel more often and more intensely than others. They are more emotional. Children also differ in emotionality at different times. A hungry child is more emotionally sensitive than he is after he has been fed. This is illustrated in Fig. 16. Note that 11 A.M., 5:30 P.M. (before meals) and 8:30 P.M. (before bedtime) are times of greatest anger outbursts.¹

There is likewise a great difference between children in their ways of expressing emotion or in their behavior while in the emotional state. Some are very expressive and their emotional states are quite obvious.

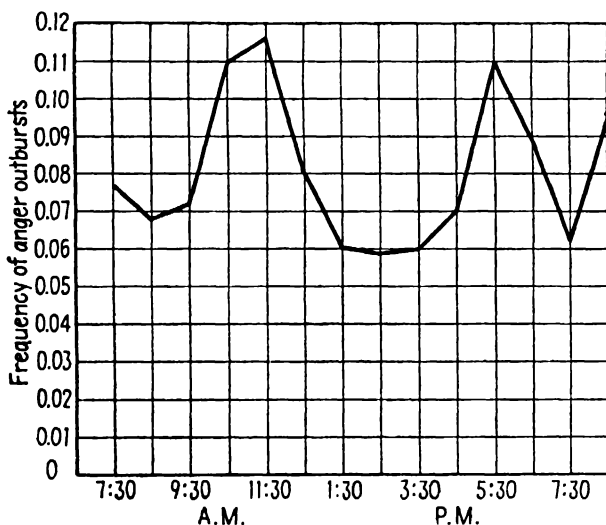


FIG. 16.—Diurnal variations in frequency of outbursts of anger among young children. (From Goodenough.)

Others are apparently calm and unemotional although they may be “boiling inside.” They repress their emotions. (More is said of this in Chap. VI.)

The physiological factors in emotion are not too well known but some things seem fairly clear. The pleasant emotions (sometimes called positive) are accompanied by the function of the cranial and sacral sections of the autonomic nervous system. The organs of the upper viscera are connected to the cranial section, which promotes digestion and other vegetative processes. The sacral section is connected with the organs of the lower viscera and promotes the elimination of waste products (bladder and bowels) and sex behavior. The unpleasant emotions are accompanied by the function of the sympa-

¹ Goodenough, F. L., *Anger in Young Children*, University of Minnesota Press, Minneapolis, 1931.

thetic section of the autonomic nervous system. This is connected to all organs of the viscera and inhibits the functions promoted by the cranial and sacral sections. Digestive processes are interrupted, heartbeat and blood pressure are increased, glycogen is converted to glucose and poured into the blood stream at an increased rate, muscles become tense, and the body is set for action. The body is in a state of annoying emotion. Obviously, the physiological processes of the enjoyable emotions promote bodily welfare, while those of the annoying emotions are debilitating. However, these physiological processes during both the enjoyable and the annoying emotions are more intense than in ordinary experiences.

The scientific study of emotion began with the research of John B. Watson to find, first, which emotions are original, or unlearned, and second, how emotions are learned. He studied newly born babies to find what stimuli would produce emotion. He discovered that the pleasant emotions are produced (in addition to satisfying the child's vegetative needs) by fondling or gently stroking the baby's body. He found that the unpleasant emotions are produced by loud noises, falling, and restraint of movement. He called these the "unlearned emotions." Then, he found that when the baby experiences an inadequate emotional stimulus at the same time as the unlearned adequate emotional stimulus, this too became adequate to produce the emotion. For example, in one of Watson's experiments, a baby was accustomed to playing with a rabbit without fear. (It was an inadequate emotional stimulus.) Then, a loud noise (an adequate emotional stimulus) was produced at the same time the baby played with the rabbit. Soon the baby reacted to the rabbit in the same way he did to the loud noise. The new emotional stimulus became a substitute for the old one.¹

Watson then concluded that most of our loves, fears, hates, etc., are learned. We do not instinctively fear snakes, or hate other races, or love our own flesh and blood, or enjoy the praise of other people. We (perhaps) inherit emotionality, or the equipment for emotional behavior, but the objects or stimuli that arouse these emotions are definitely learned.

Annoying, or negative, emotions should be avoided whenever possible. Any environmental condition that arouses the child's dissatisfying emotions is bad for the child. Both the home and the school should be so regulated that the child is protected, as much as possible, from unusually intense overstimulation.

¹ This process is called "conditioning" and is more adequately explained in the next chapter.

Avoidable Conditions in the Home That Cause Annoying Emotions. Children often become emotional by observing other members of the family who are emotional. Peculiar fears, such as fear of the dark, and unusual antagonisms, such as race hatreds, are often learned from other members of a family. A child learns to be hot-tempered by associating with others who are hot-tempered. Emotional parents produce emotional children by training as well as by heredity. "Like father, like son."

In some families, a child is often the "goat," or "butt end" of jokes. This irritates him and soon ruins even a good disposition. Teasing should never be allowed in any form.

Parents often create emotional situations by wish-washy discipline. Some orders are allowed to be violated and others are enforced. The child never knows whether to resist or to obey. This lack of regularity usually carries over to other things. There is no certainty about anything. Unstable living promotes unstable emotions.

Pressey and Robinson¹ report that, in a certain city having 1,800 blocks of single-family residences, there were but 86 emotionally unstable, or maladjusted, school children per 1,000 enrolled. In 750 city blocks of multiple-family dwellings in the same city, there were 183 emotionally unstable school children per each 1,000 enrolled. Other factors associated with maladjusted children are shown in Table 40.

TABLE 40.—FACTORS RELATED TO MALADJUSTMENT IN SCHOOL CHILDREN

Factor	Per Cent
Fathers—unskilled laborers.....	67
Fathers—semiskilled.....	22
Fathers—clerical.....	8
Fathers—professional.....	3
Inadequate family income.....	90
Living with neither parent.....	15
Living with stepparent....	20
Living with mother only.....	62
Homes rated very poor..	66
Child underweight.....	35

Avoidable Conditions in the School and Neighborhood That Cause Annoying Emotions.—Perhaps the greatest cause of emotional tension in school is "goose-stepping," or regimentation. All children are poured through the same mold, given the same courses, treated in the same way. This discourages originality and promotes submerged

¹ Pressey, S. L., and Robinson, F. P., *Psychology and the New Education*, p. 167, Harper & Brothers, New York, 1944.

resentment. Perhaps the most basic principle of the progressive-education movement is that of individualized education. The mass-production methods of the average American schoolroom are undoubtedly the worst aspect of our educational system.

Another frequent source of emotional irritation in the schoolroom is the teacher herself. Intellectually, teachers are usually well trained. They know their subject matter. They know the best methods of teaching. They know the advantages and weaknesses of various methods of discipline. But they are not always emotionally stable. They have not learned how to behave intelligently when they become irritated. Consequently, they create situations that bring about emotional stress in their pupils. Hart¹ reports a survey of 3,725 high-school seniors to find the traits of best-liked and those of least-liked teachers. His results are shown in Table 41.

TABLE 41.—FOUR MOST FREQUENTLY MENTIONED TRAITS OF BEST-LIKED TEACHERS AND OF LEAST-LIKED TEACHERS

Best-liked Teachers	Times Mentioned
Helpful with school work, explains lessons clearly. . . . .	.950
Cheerful, jolly, can take a joke. . . . .	.129
Human, friendly, companionable, "one of us". . . . .	.024
Interested in and understands pupils. . . . .	.024
Least-liked Teachers	
Cross, crabby, nagging, sarcastic, loses temper. . . . .	.708
Not helpful with school work, work not planned. . . . .	.025
Has favored students and picks on others. . . . .	.859
Haughty, overbearing, does not know you out of class. . . . .	.775

Then, too, the content of the curriculum itself is often so anachronistic and impractical that it is irritating to the child. Little of it has any value in his life outside of school. (We adults know that much of it has no value even in adult life.) Consequently the child lacks motivation and the teacher uses threats of punishment to force him to learn. This not only causes him to develop a dislike for schoolwork but also to develop constant nervous tension, which makes him even more emotionally sensitive. Schoolwork should be made to fit the child instead of trying to force him to fit a course of study that has doubtful value anyhow. This is the point of view of progressive education.²

¹ Hart, F. W., *Teachers and Teaching*, The Macmillan Company, New York, 1934.

² See Dewey, John, *Democracy and Education*, The Macmillan Company, New York, 1916; Rugg, H., and Shumaker, A., *The Child Centered School*, World Book Company, Yonkers-on-Hudson, New York, 1928; Gray, J. S., *Psychological Founda-*

INTERESTS AND ATTITUDES

Interest refers to that behavior which an individual may persist in performing because it gives him a feeling of enjoyment. Referring to the graph on page 94, interested behavior is located left of the center of the straight line designated as "ordinary experiences." When ordinary experiences are enjoyable, the individual tries to prolong them. This is called interested behavior.

Whether or not behavior is interesting depends on a number of conditions. First, if the individual has an aptitude for the behavior he is likely to perform it more successfully and therefore derive more enjoyment from it. Second, if there are no annoying factors, whether primary or secondary, in the behavior situation the enjoyment is greater than when these interfere. There is more interest. Third, if other people approve of the behavior, this additional enjoyment supplements the natural enjoyment and the tendency to prolong and repeat the behavior is greater.

It should be noted that interest is not an innate and immutable factor. Its permanence depends on the continued satisfaction derived from the behavior. If the three conditions mentioned above—innate aptitude for the behavior, freedom from annoying factors, and social approval—are all present, interest will then persist.

Attitude is a predisposition to respond to a situation with approval or disapproval. It is closely related to interest, except that it may also be negative. (Interest can be only positive; it varies only in degree.) An attitude may be strongly negative, or strongly positive, or not exist at all. For example, an individual may have a strong negative attitude (disapproval) toward one nation, a strong positive attitude (approval) toward another, and no attitude at all toward another. Like interest, an attitude is formed from experience. Enjoyable experience usually results in positive attitudes while unenjoyable experiences result in negative attitudes.

A strong attitude does not necessarily indicate a strong interest. One may approve of baseball and yet not be interested in playing or seeing it. One may disapprove of socialism and yet be greatly interested in how it works. Interest is closely associated with one's desires, likes, and wants; attitude refers to one's appraisal or evaluation of an idea or situation.

Children's Interest.—The major interests of children center around different forms of play. In the early years this is largely manipulative

tions of Education, American Book Company, New York, 1935; Kilpatrick, W. H., *The Educational Frontier*, D. Appleton-Century Company, Inc., New York, 1933.

TABLE 42.—THE MOST POPULAR PLAY ACTIVITIES OF 26,058 BOYS AND GIRLS AT FOUR AGE LEVELS

Boys	Age	Girls
Playing with a ball	10	Playing house
Playing with blocks		Playing with dolls
Playing with a wagon		Playing with a ball
Playing house		Playing school
Playing horse		Drawing
Hide-and-seek		Mulberry bush
Playing tag		Playing with blocks
Drawing		Skiping
Playing school		Making things
Playing in sand pile		Jumping rope
Football		Playing the piano
Baseball		Going to the movies
Boxing		Looking at the "funny paper"
Just playing catch		Playing with dolls
Riding a bicycle		Roller skating
Basketball	15	Riding in an automobile
Wrestling		Reading books
Roller skating		Jacks
Marbles		Listening to the victrola
Basket ball		Reading books
Football		Going to the movies
Baseball		Social dancing
Driving an automobile		Playing the piano
Tennis		Riding in an automobile
Watching athletic sports		Having dates
Hunting		Watching athletic sports
Going to the movies		Going to parties, picnics
Boxing		Basketball
Reading books		Doing gymnasium work
Having dates	20	Social dancing
Watching athletic sports		Playing the piano
Football		Having dates
Basketball		Going to entertainments, etc.
Listening to the radio		Just hiking or strolling
Going to the movies		Going to the movies
Driving an automobile		Reading books
Reading the newspaper		Watching athletic sports
Tennis		Card games
Baseball		Riding in an automobile

and individualistic. Later, it becomes more complex and socialized. Lehman and Witty¹ studied the play activities of some 26,000 children

¹ Lehman, H. C., and Witty, P. A., *The Psychology of Play Activities*, A. S. Barnes & Co., New York, 1927.

and youth to find the trend of play interests. They found that play becomes more vigorous, more complex, more socialized, and more sex discriminative as the child grows older. However, as he passes adolescence and reaches the adult level (age twenty) he becomes less active himself and more interested in watching activity. These results are shown in Table 42.

Children's reading interests also undergo major changes as they become older. Younger children are interested in fairy stories and highly illustrated reading, such as the comic strips. Later, adventure stories and juvenile fiction become more popular. Jordan¹ surveyed the books read by several thousand school children and found results as shown in Table 43.

TABLE 43.—PERCENTAGES OF CHILDREN INTERESTED IN VARIOUS TYPES OF BOOKS

Type of book	Ages							
	Boys				Girls			
	9-11	12-13	14-16	17-18	9-11	12-13	14-16	17-18
Adult fiction	4	6	18	30	15	33	45	58
Juvenile fiction	27	19	11	9	67	44	30	13
Adventure	56	64	59	49	12	17	18	22
Miscellaneous	13	11	12	12	6	6	7	7
Number of children	59	253	846	283	87	336	1,195	414

Johnson² made a study of the parts of the newspaper read by the school children in Duluth (grades 5 to 11). He found the comics page at the head of the list for both boys and girls at all ages. The front page was relatively high for both sexes (it increased with age), and the sport page was high for the boys. All other parts of the newspaper were read by less than 50 per cent of the children. Even the children's page was read by only 30 per cent of the boys and 44 per cent of the girls.

An interesting study of the vocational interests of children was made by Lehman and Witty.³ They gave a vocational attitude test to 27,000 school children ranging in age from eight to sixteen years.

¹ Jordan, A. M., *Educational Psychology*, p. 160, Henry Holt & Company, Inc., New York, 1942.

² Johnson, B. L., Children's Reading Interests as Related to Sex and Grade in School, *Sch. Rev.*, 1932, **40**, 257-272.

³ Lehman, H. C., and Witty, P. A., One More Study of Permanence of Interest, *J. Educ. Psychol.*, 1931, **22**, 481-492.

Changes in the vocational interests of boys with increase in age is shown in Table 44.

TABLE 44.—RANK OF OCCUPATIONS LIKED BEST BY BOYS OF SCHOOL AGE

Occupations	Ages					
	8½	10½	12½	14½	16½	18½
Aviator.....	2	1	1	1	1	1
Cowboy.....	1	2	2	16		
Lawyer.....	6	10	7	10	4	3
Civil engineer.....	..	8	3	2	3	7
Physician.....	11	10	11	11	6	6
Army officer.....	14	3	6	24	21	8
Musician.....	20	14	10	7	9	5
Electrical engineer...	..	20	5	3	2	4
Architect.....	..	..	17	4	5	2
Physical director or coach.....	..	..	.	23	11	1
Soldier.....	3	4	20			

Children's Attitudes.—An attitude is the part of a situation that an individual carries with him. A child responds to his teacher, for example, not as the teacher really is but as she is when combined with the predisposition toward her that the child carries within himself. The teacher may be aided or handicapped by this attitude, but she cannot escape from it.

Attitudes are formed as soon as the child begins to learn, and they may last as long as he lives. Obviously, the home is fundamentally important in the development of attitudes. This is shown in a study that measured the attitudes of parents and children on religion, war, and communism.¹ Table 45 shows the correlations between the various members of the families studied.

TABLE 45.—PARENT-CHILD CORRELATIONS IN ATTITUDE

	Church	War	Communism
Mothers—sons.....	.57	.45	.58
Mothers—daughters.....	.69	.43	.49
Fathers—sons.....	.64	.45	.54
Fathers—daughters.....	.64	.43	.62
All siblings.....	.59	.36	.47
Mothers—fathers.....	.75	.43	.57

¹ Newcomb, T. M., and Svehla, G., *Intra-family Relationships in Attitude, Sociometry*, 1937, 1, 180-205.

Attitudes are also affected by reading material. Annis and Meier¹ studied the effects of favorable and unfavorable editorials on the attitudes of two groups of college students concerning a visiting politician. One group read the favorable editorials and the other read the unfavorable editorials. The results of this study are shown in Fig. 17. Perhaps the reason there is so little overlapping between

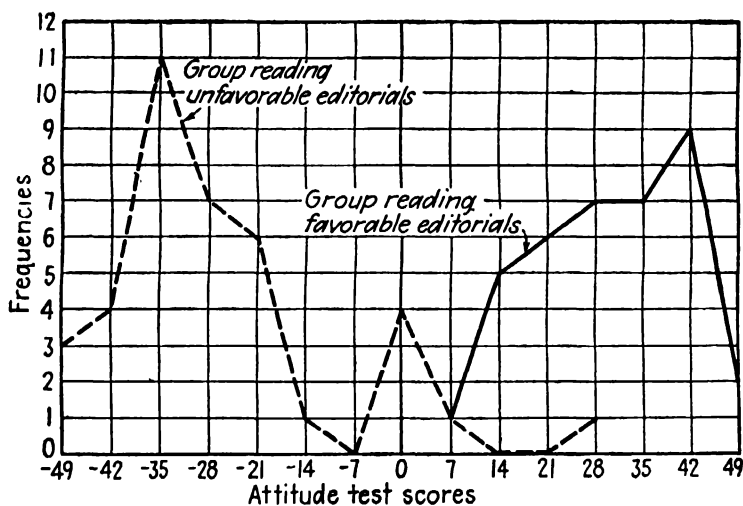


FIG. 17.— Attitude scores toward a visiting politician as affected by editorials.

the two groups is that the politician was relatively unknown to both groups before the editorials were read.

Voelker² conducted an experiment to evaluate the effects of boy-scout training on attitudes toward trustworthiness. Two groups of scouts and two groups of boys who were not scouts were given two trustworthiness tests within a 7-week interval. During the interval the scouts were given regular scout training in trustworthiness. The tests were practical life situations in which the boys were given an opportunity to be dishonest with money, to tell an untruth, to retain borrowed property, etc. There were 10 such items on each test. During the 7-week interval the scouts gained almost 21 per cent in trustworthiness over that of the control group. The results are shown in Table 46.

¹ Annis, A. D., and Meier, N. C., The Induction of Opinion through Suggestion by Means of Planted Content, *J. Soc. Psychol.*, 1934, 5, 65-81.

² Voelker, P. F., The Function of Ideals and Attitudes in Social Education, *Teach. Coll. Contr. Educ.*, 1921, No. 112.

TABLE 46.—THE EFFECTS OF BOY SCOUT TRAINING ON THE ATTITUDE OF TRUSTWORTHINESS

Group	First test, per cent	Second test, per cent	Gain, per cent
Scouts I.....	63.5	77	13.5
Scouts II.....	64.5	74.4	9.9
Control I.....	75	67.4	— 7.6
Control II.....	58.2	48	—10.2
Average difference favoring Scout groups			20.6

Motion pictures have been found to have lasting effects on the attitudes of children. Peterson¹ tested children's attitudes toward certain topics and then showed the children moving pictures dealing with those topics. She tested them again immediately after the picture and again after intervals of varying length. She found that significant changes in attitudes were produced by motion pictures and that a large percentage of these changes remained after several months time. Her results are shown in Table 47.

TABLE 47.—EFFECTS AND PERMANENCE OF MOTION PICTURES ON ATTITUDES

Picture	Attitude	Change (raw score)	Difference $\frac{P.E.d}{}$	Permanence remaining after	
				Mo.	%
<i>Sons of the Gods</i>	Pro-Chinese	1.31	17.	19	60
<i>Birth of a Nation</i> ..	Anti-Negro	1.53	25.	5	62
<i>Four Sons</i>	Pro-German	.47	5 37		
<i>The Criminal Code</i>	Prison reform	.50	.....	9	78

It is now obvious that children's attitudes are produced by experience and they can be changed by controlling that experience. The success of Nazi Germany in producing a generation of fanatics by controlled education (both in school and out) indicates how effectively attitudes can be molded under totalitarian conditions.

SUMMARY

Children live within the confines of three limitations—heredity, immaturity, and environment. Every child is born with *hereditary*

¹ Peterson, R. G., et al., *Motion Pictures and the Social Attitudes of Children*, The Macmillan Company, New York, 1933.

limits beyond which no development and training will enable him to go. These limits may be greater than those of the average child, less than those of the average child, or equal to those of the average child. Whatever the degree, they are immutable. Then, the child is also limited by his *immaturity*. Growth expands these limitations. The child is more able to learn as he grows and matures. Learning that is impossible at one age may become easy at a later age. However, the limitations of immaturity are also immutable except as the age factor varies. The third limitation is *environment*. The child with superior musical aptitude (hereditary limits less than those of the average child), for example, may or may not develop musical ability depending on whether or not his environment stimulates his interest in music and provides the facilities for training him. With the progress of culture, educational opportunities for the development of an ever-increasing range of aptitudes are augmented.

It has been found that adult personalities are largely determined by the experience of childhood. In other words, they are formed during the years of maturation. Emotions and interests constitute the major habits of personality and have been studied carefully. Certain factors in the home, school, and neighborhood have been found to be closely associated with emotional instability, whereas other factors seem to produce emotional stability. Likewise, children's interests and attitudes are determined by factors in their environments. Consequently, it is fundamentally important to control the child's environment if his personality development is to be controlled.

RECOMMENDED SUPPLEMENTARY READINGS

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CHAPTER IV

PSYCHOLOGY IN EDUCATION

Learning

Conditions that affect Learning

Maturation

Learning Aptitude

Emotion

Motivation

Competition and Cooperation

Success and Failure

Method of Study

Transfer of Learning

How Learning Transfers

What Learning Transfers

Within School

To Practical Situations

What Conditions Promote Transfer

Tests and Measurements

The Measurement of Aptitudes

Intelligence Tests

Mechanical Tests

Other Aptitude Tests

Achievement Tests

Homemade Tests

Standardized Tests

Personality Tests

Acquaintance Ratings

Trouble Questionnaires

Experimental Tests

Psychology has been applied more extensively in education than in any other field. More trained psychologists are employed, more psychological devices and techniques are used, more psychological research is being conducted, and more changes have been made in methods and policies as a result of psychology in the field of education than in any other area of its use. Education is psychology's greatest consumer.

The use education has made of psychology has been in two major areas—learning and testing. The following pages will review some of the ways psychology has been useful to the educator in each of these areas.

LEARNING

In Chap. I a brief review was given of the development of the laws of learning by Thorndike and the method of the conditioned response by Pavlov. Any discussion of learning must be based on these two significant developments. (It is advised that the student read these sections in Chap. I again at this time.)

Also, in Chap. III a fundamental distinction was made between learning and maturation. Both learning and maturation involve the alteration of patterns of physical structure by metabolic processes. The difference is that some pattern changes are somehow innate in the germ plasm and occur largely irrespective of environment, while others are completely dependent on environment. The development of innate patterns is called "maturation;" the development of those patterns controlled by environment is called "learning." Learning is the process of forming behavior patterns while adjusting to environmental conditions. It is the inevitable result of the process of behavior. It can be controlled only by controlling behavior.

CONDITIONS THAT AFFECT LEARNING

Learning may be fast or slow, permanent or temporary, continuous or intermittent, depending on the presence or absence or combination of a large number of affecting factors. Some of these are not yet well understood. Others have been studied with sufficient care to justify conclusions. The following pages review some of the more significant factors affecting learning.

Maturation.—Learning is not the same as maturation, but it is very definitely limited by it. Maturation is independent of learning, but learning is not independent of maturation. The limits maturation places on learning are illustrated by various co-twin experiments. The procedure is to give one of a pair of identical twins extensive training at an early age. The other is given limited training at a later age. The amount of learning in each is then compared to see the effect of the two stages of maturation. All such studies show that limited training after proper maturity is superior to extensive training before proper maturity.

Gesell and Thompson¹ studied the effects of maturation on the learning of a certain pair of identical twins—*T* and *C*. Beginning at the age of forty-six weeks, *T* was given 6 weeks' training in climbing steps. At the age of fifty-two weeks, she could climb the steps in 25

¹ Gesell, A. G., and Thompson, H., Learning and Growth in Identical Infant Twins, *Genet. Psychol. Monogr.*, 1929, 6, 1-123.

seconds. Beginning at the age of fifty-three weeks, twin *C* was given 2 weeks of similar training. At the age of fifty-five weeks, she could climb the steps in 10 seconds. "The climbing performance of twin *C* at fifty-five weeks was far superior to the climbing performance of twin *T* at fifty-two weeks, even though twin *T* had been trained seven weeks earlier and three times as long. The maturation advantage of three weeks of age must account for this superiority."

The restrictions that maturation places on learning are also evident from studies of learning at the early grade-school levels. It has been

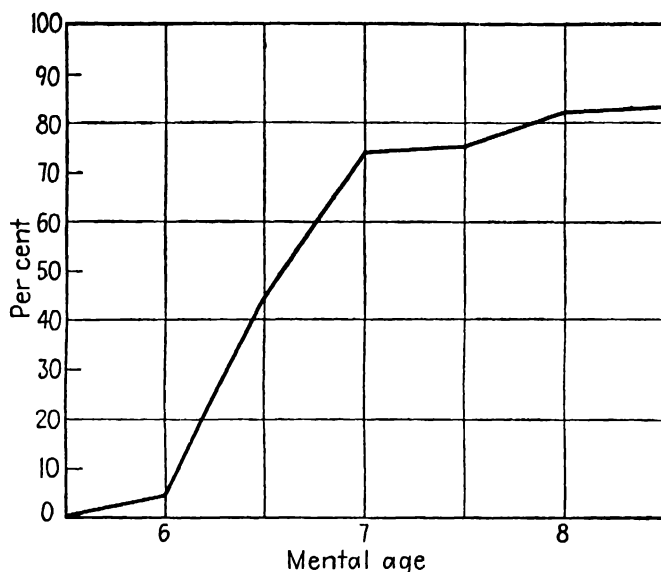


FIG. 18.—Percentage of children of various mental ages making satisfactory progress in reading.

found, for example, that "at the end of the second grade, children whose formal arithmetic was begun in the first grade were not ahead of pupils who had had none until the second grade. . . . This experiment and others indicate that we must be wasting a tremendous amount of time in our schools teaching children subject matter that is too difficult for their level of maturity. If for the average and under-average children we delayed the teaching of most of the present subjects a year or two, we should probably discover that in the end our graduates had learned more, acquired better habits of scholarship, and were in better health."¹

¹ Sorenson, H., *Psychology in Education*, p. 276, McGraw-Hill Book Company, Inc., New York, 1940.

Morphett and Washburne¹ studied the effectiveness of teaching reading to children of various mental ages. They found that less than 10 per cent of children with a mental age of six can make satisfactory progress in reading. However, at the mental age of seven, more than 70 per cent of them can make satisfactory progress (see Fig. 18 for these data). Obviously, the educator should wait for maturation before he should attempt to teach the child to read.

There are a number of reasons why premature learning is detrimental to the child. First, he learns wrong habits that are difficult to correct later on. For example, if he is too young to learn to write properly he learns to write improperly. This is likewise true of all school subjects. Second, premature learning is so difficult that the child forms a dislike for the subject matter. This is most unfortunate because the subject matter may be in the area of the child's greatest aptitudes. Third, premature learning brings about unnecessary nervous and emotional tensions. The average schoolroom produces emotional tensions at best, and the difficulties of premature learning add to these greatly.

Learning Aptitude.—If a mental age of seven is necessary for satisfactory progress in learning to read, it makes but little difference whether a child with a mental age of five, for example, is immature or innately mentally handicapped. In either case he cannot make satisfactory progress in reading. All learning requires a degree of learning aptitude—the more difficult the learning, the more aptitude necessary. As indicated in Fig. 9 (Chap. III) all aptitudes are

TABLE 48.—CORRELATIONS BETWEEN INTELLIGENCE AND PROFICIENCY IN SCHOOL SUBJECTS*

Subject	<i>r</i>
Composition....	.63
Reading...	.56
Arithmetic...	.55
Spelling...	.52
Writing....	.21
Handwork...	.18
Drawing.....	.15

* After C. Burt, *Mental and Scholastic Tests*.

inherited and constitute limits beyond which no amount of training will enable an individual to go. Consequently, the educator must be able to recognize the degree of the child's native potentialities as well as his degree of maturation. Later on in this chapter, methods of measuring native aptitudes will be reviewed.

¹ Morphett, M. V., and Washburne, C.. *When Should Children Begin to Read?* *Elem. Sch. J.*, 1931, 31, 496-503.

However, a low I.Q. does not mean that a child is handicapped in all learning. Low intelligence usually means only that the individual is inferior in abstract learning. Table 48 shows the relation between intelligence and various types of academic learning. Note that drawing and handwork have but little relation to intelligence.

Emotion.—In considering the relation of emotion to learning it is necessary to distinguish between intense emotion and mild emotion or emotional tone. Mild emotion aids the learning process while intense emotion, especially if annoying, interferes with it. Carter¹ studied the ability of sixth- and seventh-grade children to learn to associate pictures with pleasant, unpleasant, and indifferent words. He found that 2,200 errors were made on the pleasant words, 2,724 errors on the unpleasant words, and 3,106 errors on the indifferent words. Both the pleasant and the unpleasant associations were made with fewer errors than the indifferent ones.

A			B		C	D	E
Non-emotional situation							
A	B	C	D	E			
Emotional situation							

FIG. 19.—Effects of emotion on quality of response in learning.

However, the effect of intense emotion on learning is a different story. Patrick² studied the effects of emotion on the ability of adults to discover the way out of a problem room. Their responses were rated on a quality scale from A ("tendency to make rational inferences") to E ("automatisms, unadaptive, preservative"). Emotion was aroused by cold water, electric shock, and loud noise. The results are shown in Fig. 19. Note the decrease in A quality (rational) behavior and the increase in E quality (unadaptive) behavior during emotion.

Motivation.—One cannot learn more or faster than his hereditary limitations permit. However, whether one learns as much or as fast as he can depends on how much he wants to learn. Getting children to want to learn is the problem of *motivation*.

Modern education has attempted to secure *derived motivation* by relating learning to the things children already want to do. For example, children like to explore. Consequently, as a part of the

¹ Carter, H. D., Emotional Correlates of Errors in Learning, *J. Educ. Psychol.*, 1936, **27**, 55–67.

² Patrick, J. R., Studies in Rational Behavior and Emotional Excitement, *J. Comp. Psychol.*, 1934, **18**, 153–195.

educational program, field trips are conducted that involve exploration and useful learning. A small college recently sponsored a sociology field trip to Chicago, a distance of some 600 miles. The students enjoyed the trip and, incidentally, learned a lot of sociology that otherwise would have been dull and uninteresting. Another method of derived motivation is called the "project," in which children perform some interesting task involving the desired learning. Most laboratory experiments are of this nature. In such derived motivation the child performs the behavior for its own sake, but the educative values are by-products.

The great difficulty in motivating children to learn what is called their "social heritage" is the lack of its present usefulness. Education is preparation for a future that seems to the child to be a long way off. Why learn something now that will not be needed for 5, 10, or 15 years yet? One great educator (John Dewey) suggests that the best education is not preparation for the future but the most adequate adjustment for the present. The difficulty with this idea is that too much learning would then pile up at the late adolescent levels. Either the child would not be prepared, or the future would have to be postponed. The method of civilization, as distinguished from that of primitive society, is to prepare for the future.

A number of methods are used by the modern educator for motivating children to learn that which has no immediate usefulness. They are all very effective when skillfully used.

Competition and Cooperation.—Certainly the child is not born with an instinct for either competition or cooperation. He merely finds both to be enjoyable and soon acquires a desire to compete with other children at some times, to cooperate with them at other times, and to compete with some while cooperating with others at still other times. Competition and cooperation are both involved in a large part of the child's play activities.

The traditional school encourages competition more than it does cooperation. In fact, some teachers discourage cooperation in schoolwork. When the writer's daughter was in grade school she was reprimanded by a teacher for helping her girl friend on an assignment in which both girls were interested. The teacher considered it dishonest. Perhaps one reason why so many people insist on a competitive economic system is that our schools have fostered that type of thinking.

The relative effectiveness of competition and cooperation as a means of motivating schoolwork was studied by Maller.¹ His subjects

¹ Maller, J. B., *Cooperation and Competition: An Experimental Study in Motivation*, *Teach. Coll. Contr. Educ.*, 1929, No. 384.

were 1,538 children in grades 5 to 8. The work was in arithmetic. The control group studied in the usual manner with no special motivation. In one experimental group, the pupils competed with each other for class rank and individual prizes. In another group, they cooperated with each other within their classes but competed with other classes for class honors and prizes. The results from three schools are shown in Table 49. Note that both the competition and the coopera-

TABLE 49.—COMPETITION AND COOPERATION COMPARED AS MEANS OF MOTIVATING WORK IN ARITHMETIC

	School			Average
	I	II	III	
Groups:				
(1) Control: unmotivated.....	44.8	37.3	41.	41.2
(2) Individual competition (for class rank)....	50.1	43	45.9	46.3
(3) Intraclass cooperation (interclass competition).....	45.6	40.4	44.4	43.6
Superiority of:				
Competition (2) over control (1)	5.3	5.7	4.9	5.1
Cooperation (3) over control (1).....	.8	3.1	3.4	2.3
Competition (3) over cooperation (2).....	4.5	2.6	1.5	2.9

tion groups are superior to the control group but competition is more effective than cooperation when these two forms of motivation are compared. When the children were allowed to choose for themselves whether they would compete for individual prizes or cooperate for class prizes, 74 per cent chose the former type of motivation.

TABLE 50.—COMPETITION AND COOPERATION COMPARED AS MEANS OF MOTIVATING INCREASE IN READING SPEED

Groups	Initial score	Final score	Per cent gain
Control.....	167.3	181.9	8.7
Individual competition....	167.7	226	34.7
Intrasection cooperation.....	167.5	191.9	14.5

Sims¹ performed a similar experiment with college students. He compared the relative effectiveness of competition and cooperation as a means of motivating his subjects to increase their reading speed. Progress was measured after 12 practice periods distributed over 4

¹ Sims, V. M., *The Relative Influence of the Two Types of Motivation on Improvement*, *J. Educ. Psychol.*, 1928, 19, 480-484.

weeks. The control group practiced as directed but was not otherwise motivated. In the competition group each student was paired with another of equal initial ability and then urged to surpass him. Each knew the score of the other. The cooperative group was divided into competing sections with group scores posted. The results are shown in Table 50.

Hurlock's frequently quoted study¹ also shows the value of competition as a means of motivating progress in arithmetic. She paired 155 children (73 boys, 82 girls) of grades 4 and 6, using one of each pair for the control group and one for the experimental group. The control group was encouraged to do the best they could on the tests. The experimental group was divided into subgroups that competed with each other. Her results are shown in Table 51.

TABLE 51.—COMPETITION AS A MOTIVATING FACTOR IN ARITHMETIC

Tests	Groups		Superiority of competition
	Control	Competition	
First	7.43	7.24	— 19
Second	8.12	11	2 88
Third	8.19	11.26	3.07
Fourth	7.99	11.17	3.18
Fifth	8.06	11.39	3.33

Success and Failure.—Success in learning may be indicated in many ways—reaching a goal, being praised by others, getting high grades, getting material rewards (money or otherwise). Likewise failure may be indicated in many ways—not reaching a goal, being reproved by others, getting low grades, being punished. The value of these and other forms of success and failure in motivating school work has been the subject of many studies. Some of the more representative of these are briefly reviewed in the following pages.

Hurlock² compared the learning of four equivalent groups of grade-school children in arithmetic under four different forms of motivation. The children in the “praised” group were named individually and praised for their good work before the rest of the class. The children in the “reproved” group were named individually and

¹ Hurlock, Elizabeth B., The Use of Group Rivalry as an Incentive, *J. Abnorm. Soc. Psychol.*, 1927, **22**, 278–290.

² Hurlock, Elizabeth B., An Evaluation of Certain Incentives Used in School Work, *J. Educ. Psychol.*, 1925, **16**, 145–159.

reproved for their poor work before the rest of the class. The children in the "ignored" group were in the room and heard the others being praised and reproved but their names were not mentioned in either praise or blame. The children in the control group were in another room under ordinary school conditions. Table 52 shows the progress made by all four groups on five successive daily tests.

TABLE 52.—AVERAGE DAILY SCORES MADE IN ARITHMETIC BY GROUPS WORKING UNDER FOUR TYPES OF MOTIVATION

Days	Motivation groups			
	Control	Praised	Reproved	Ignored
First	11.8	11.8	11.8	11.8
Second	12.3	16.6	16.6	14.2
Third	11.6	18.8	14.3	13.3
Fourth	10.5	18.8	13.3	12.9
Fifth	11.4	20.2	14.2	12.4
Average	11.52	17.24	14.04	12.92
Average gain	-.28	5.44	2.24	1.12

Flügel¹ studied the effects of a constantly increased money reward on the behavior of 46 English schoolgirls (ages nine to thirteen) in adding numbers. Each girl received a "flat rate" in money plus a constantly increasing bonus each time she broke her own previous week's record. The records of the girls were posted and they worked in groups. The curve of their constantly increasing improvement is shown in Fig. 20. Unfortunately, Flügel did not compare these results with a control group of girls with the same qualifications and under the same conditions except for the constantly increasing motivation.

Various other forms of motivating schoolwork have been studied. Frequent examinations have been found to be an effective motive in learning (see Chap. II). Jones² studied the effects of a short test each day on the retention of the content of classroom lectures. He found that a group tested daily was 21 per cent superior to a control group of students on factual material and 18 per cent superior on "thought" material.

¹ Flügel, J. C., Practice, Fatigue and Oscillation, *Brit. J. Psychol. Monogr. Suppl.*, 1928, No. 13.

² Jones, H. E., Experimental Studies in College Teaching, *Arch. Psychol.*, 1923, No. 68.

An interesting study was made by Leuba¹ to determine the relative motivation values of (1) no incentives, (2) chocolate bars, (3) rivalry for social prestige (captaincy and class rank), and (4) incentives (2) and

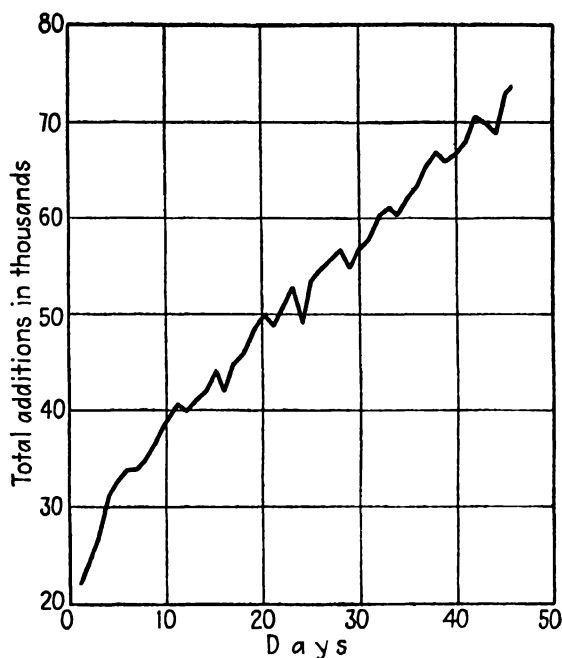


FIG. 20. - Effects of constantly increasing motivation with school girls in solving simple problems in addition.

(3) combined. The work consisted of practice exercises in multiplication. The subjects were 35 children in grade 5A. The procedure was to vary the nature of the motivation at each practice period. The results are shown in Table 53.

TABLE 53.—AVERAGE NUMBER OF MULTIPLICATION PROBLEMS SOLVED IN TEN-MINUTE PRACTICE PERIODS WITH DIFFERENT FORMS OF MOTIVATION

Form of motivation	Mean	Superiority over no incentive
(1) No incentive. . . .	23.6	
(2) Chocolate bars. . . .	35.9	12.3 (52%)
(3) Social prestige. . . .	34.6	11. (47%)
(4) Combined incentives. . . .	38.9	15.3 (65%)

¹ Leuba, C., *The Measurement of Incentives and Their Effect*, *J. Soc. Psychol.*, 1932, 3, 107-114.

TRANSFER OF LEARNING

One of the most mooted problems in the field of educational psychology has been that of the transfer of mental learning. In what way and to what extent will the knowledge, attitudes, and understandings learned in one situation be useful in another? There are at least three problems involved in this controversy: (1) How does the transfer of mental learning take place? (2) What sorts of mental learning transfer more effectively than what other sorts of learning? (3) When, or under what conditions, does the transfer of mental learning take place?

How Learning Transfers.—Before experimental investigation began in educational psychology it was believed that the mind was made up of powers, or faculties, which could be developed by exercise. The power of memory, for example, could be developed by exercise in memorizing—hence the study of Latin, Greek, etc. The power of reasoning could be developed by exercise in reasoning—hence the study of geometry. The power of concentration could be developed by exercise in concentrating—hence the study of any subject that was uninteresting. Then, when a mental power became developed it was supposed to function on that level in all situations, regardless of similarity to the situation of development. For example, the power of memory developed in the study of Latin would function just as well in the study of any other subject. Consequently, education in itself did not need to be useful as long as the mental powers it developed were useful.

It was known that muscular skill and muscular strength acquired in one situation would transfer to another. For example, Davis¹ had proved that training the right hand improved the left-hand performance. He found that skill acquired by hitting a target with a fencing foil in the right hand transferred to the left hand and improved its performance by 75 per cent. He also found that strength developed in the right arm by swinging dumbbells transferred to the left arm and increased its strength. Consequently it was assumed that mental training would transfer in a like manner.

However, a little scientific investigation soon revealed that mental powers are not so generalized as is muscular power. Instead, they are specific and varied abilities that are *identified with the situations in which they are developed*. There is not a generalized power of memory, for example, but many memory abilities varying with the situations in which they function. A child who can easily memorize a large

¹ Davis, W. W., *Researches on Cross Education, Yale Psychol. Lab.*, 1898, 6, 6-50.

Latin vocabulary may have difficulty memorizing chemical formulae, or historical dates, or the names of the bones of the cranium. There does not seem to be a generalized power of memory or of any other mental faculty.

The first experiment in the transfer of mental learning was performed by William James.¹ He tested his own memory ability by noting the time and the repetitions necessary for him to memorize 158 lines from Victor Hugo's *Satyr*. He then trained his memory by practicing 20 minutes daily for 38 days memorizing Milton's *Paradise Lost*. Then, he again tested his memory ability on 158 more lines from the *Satyr*. He found that there was no transfer. His memory ability was not improved. He repeated the experiment on four of his students but found no transfer.

Then, scientific investigation also revealed that the future usefulness (transfer) of any type of mental learning (whether knowledge, understanding, or attitude) depends on the similarity of the two situations—the learning situation and the later situation of application. The more the two are alike, other things being equal, the more easily transfer can take place. This means that the content of school learning should be governed by the child's needs after he leaves school. There is no value in school learning if it has no use after school days are over. Latin is valuable in the preparation for life only to the extent that it is used in life. Geometry should be studied in school only if it is used outside of school. No school subject matter can be justified by the claim that it trains a hypothetical mental power. Schoolwork that is not valuable for its own sake in life outside of school should be eliminated from the curriculum.

Furthermore, it was found that even though learning has useful applications it must not be assumed that the child will make those applications unless he is trained to do so. Transfer of training cannot be left to chance. Subject matter must not be studied in the abstract but *in use*. Haskell² compared two equated groups of pupils on gains in English vocabulary. One group had been taught Latin by the conventional method, while the other was taught Latin as it is related to English. The second group gained twice as much as the first in knowledge of English words of Latin derivation and surpassed the first group in knowledge of other English words. The results are shown in Table 54.

¹ James, William, *Principles of Psychology*, Vol. I, pp. 666–668, Henry Holt & Company, Inc., New York, 1890.

² As quoted by S. L. Pressey and F. P. Robinson, in *Psychology and the New Education*, p. 579, Harper & Brothers, New York, 1944.

TABLE 54.—GAINS MADE IN ENGLISH VOCABULARY BY PUPILS STUDYING LATIN PER SE AND THOSE STUDYING LATIN IN RELATION TO ENGLISH

Group	N	Gains made in English vocabulary	
		Latin derivatives	Non-Latin derivatives
Conventional Latin.....	118	4.05	2.77
Latin in application.....	118	8.12	3.49

Consequently, two conclusions may be made as to how mental learning obtained in one situation transfers to another—(1) maximum transfer takes place when the learning itself has maximum future usefulness, provided, (2) a representative sampling of those uses has also been learned. In other words, the transfer of learning is greatest when useful material has been learned in use. Both the content of education and the method of educating are important for greatest transfer of mental training.

What Learning Transfers.—The educator is always interested in the practical problem of *what* school learning transfers most. Every school subject has been evaluated from this point of view. Some research has dealt with the problem of the transfer of learning in a certain subject to other school subjects (such as the effects of the study of Latin on learning in English), and other research has been concerned with the more practical problem of the relation of learning in a certain subject to life situations after school (such as the effects of studying agriculture on the management of a farm in later years). Typical studies of both types will be briefly reviewed.

The Transfer of Mental Learning within School.—Thorndike¹ studied the transfer value of various high-school subjects on 8,564 pupils in grades 10, 11, and 12. A battery of intelligence and achievement tests was given in May, 1922, and again in May, 1923. The relation of the relative gains made on these tests to the school subjects the pupils had studied in the meantime was carefully noted. Allowances were made for such variables as intelligence, age, sex, other subjects studied, etc. Thus, weighted gains for each school subject were computed. While differences were found, they were not great (see Table 55). The author concludes, "The expectation of any large differences in general improvement of the mind from any one study rather than another seems doomed to disappointment. The chief reason why good thinkers seem superficially to have been such by

¹ Thorndike, E. L., *Mental Discipline in High School Studies*, *J. Educ. Psychol.*, 1924, 15, 1-22; 83-98.

having taken certain school studies is that good thinkers have such subjects, becoming better by the inherent tendency of the good to gain more than the poor from any study."

TABLE 55.—DIFFERENCES IN TEST GAIN BETWEEN PUPILS TAKING CERTAIN SUBJECTS AND OTHER EQUATED PUPILS NOT TAKING THOSE SUBJECTS

School subjects	Weighted gains
Arithmetic and bookkeeping.....	2.92
Chemistry, physics, and general science..	2.64
Geometry, algebra, and trigonometry.	2.33
Latin and French.....	1.64
Physical training.....	.66
Civics, economics, psychology, and sociology.....	.27
History, music, shop, Spanish, English, drawing, and business	.00
Dramatic art.....	-.29
Stenography, cooking, and sewing.....	-.47
Agriculture and biology.....	-.90

The same author with two collaborators¹ extended this study to discover what effects the various high-school subjects have on the ability to think. They used a battery of 14 tests of various phases of thinking. Again the "differences are so small and the unreliabilities are relatively so large that the influence of the subject studied seemed unimportant." (See Table 56.)

TABLE 56.—DIFFERENCES IN THINKING ABILITY BETWEEN PUPILS TAKING CERTAIN SUBJECTS AND OTHER EQUATED PUPILS NOT TAKING THOSE SUBJECTS

School Subjects	Weighted Gains
Algebra, geometry, trigonometry, etc.....	3.0
Civics, economics, psychology, sociology.....	2.9
Chemistry, physics, general science.....	2.7
Arithmetic and bookkeeping	2.6
Physical training, athletics. . . . .	.8
Latin, French.....	.8
Business, drawing, English, history, music, shop, Spanish. . .	.0
Cooking, sewing, stenography.....	-.1
Biology, zoology, botany, physiology.	-.2
Dramatic art.	-.5

The Transfer of Mental Learning to Practical Situations.—After all, the principal value of any school subject is the extent to which it affects the behavior of the pupil to his advantage in practical life situations as well as academic situations. Hamlin² studied the effects

¹ Broyler, C. R., Thorndike, E. L., and Woodyard, E., A Second Study of Mental Discipline in High School Studies, *J. Educ. Psychol.*, 1927, 18, 377-404.

² Hamlin, H. M., Measuring the Effects of School Instruction through Changes in Community Practice, *J. Educ. Res.*, 1928, 18, 315-317.

of training in vocational agriculture on the farming habits of students after they left school. As shown in Table 57, there was not only a transfer effect on those trained but the ideas learned were also passed on to their neighbors.

TABLE 57.—EFFECTS OF INSTRUCTION IN AGRICULTURE ON THE PERCENTAGE OF FARM LAND SOWN IN LEGUMES

Groups	First survey	Second survey	Gain
Uninstructed neighbors.	6.7	8.1	1.4
Ex-agriculture students.	11	16.4	5.4

Scharff¹ studied the transfer effects of special training in health education to the selection of food in a school cafeteria. Her results, shown in Table 58, indicate that children selected food more intelligently after the health education than before.

TABLE 58.—TRANSFER EFFECTS OF INSTRUCTION IN HEALTH ON CHOICE OF FOOD ITEMS IN A SCHOOL CAFETERIA

Food	Before	After	Per cent gain
Milk (half-pints)....	4,624	5,697	23
White bread sandwiches.....	10,064	8,704	-14
Brown bread sandwiches.	1,020	2,212	117
Salads.....	680	901	33

Consequently, two conclusions would seem to be justified: First, school subjects do not have significantly different values in their transfer to other school subjects. Academic knowledge does not seem to depend on the subjects studied but rather on the caliber of the student himself. Second, those school subjects having vocational usefulness seem to have significant transfer value to practical situations. By implication this would seem to suggest that the so-called "cultural" subjects have more doubtful transfer value to practical situations.

What Conditions Promote Transfer?—In Haskell's study, quoted above, the amount of transfer depended in part on whether or not Latin was taught for transfer. When Latin is taught in relation to English, its usefulness in understanding English is then greater than when it is merely taught as Latin. Too much schoolwork is taught for its own sake and not for its future value. Useful learning must be

¹Scharff, Ruth, The Health Education Program in Connection with the Cafeteria, *Prac. Home Econ.*, 1934, 12, 197.

acquired in use. Children must be taught not only useful learning but also how to use it.

A second condition that affects the transfer of learning is the intelligence of the learner. Werner¹ compared pupils with low, medium, and high intelligence who had studied a foreign language, to pupils with low, medium, and high intelligence who had not studied a foreign language on a series of tests in English usage. He found that, while superior pupils did better on English tests because of the study of a foreign language, pupils of average and inferior ability apparently were handicapped by it. In other words, the study of a foreign language apparently has positive transfer value for superior pupils and negative transfer value for average and inferior pupils. Werner's results are shown in Table 59.

TABLE 59.—COMPARISON OF PUPILS OF VARIED INTELLIGENCE WHO HAVE STUDIED FOREIGN LANGUAGE WITH THOSE WHO HAVE NOT ON TESTS OF ENGLISH USAGE

Tests	Superiority on tests		
	Low I.Q.	Medium I.Q.	High I.Q.
Reading speed	11 2*	7.8*	12.2
Reading comprehension	3 1	1 7	8.9
Punctuation	1.8*	.1*	.1*
Sentence structure	1 1*	2*	.6*
Grammar	1.2*	1 5*	3
Language usage	4 8*	1 4*	3.7

* Indicates superiority of the nonlanguage group.

Third, the transfer of learning depends on the method of teaching. Overman² compared the transfer effects of four methods of teaching simple addition to four equated groups (112 pupils in each) of second-grade pupils. Group I was shown how to add but no explanation was given. Group II was aided in developing general methods of procedure. They were encouraged to draw conclusions and use them in solving subsequent problems. Group III discussed reasons and principles but were left free to make their own generalizations. They were given explanations but not generalizations. Group IV was taught by both generalizations and explanation. They formulated

¹ Werner, O. H., *The Influence of the Study of Modern Foreign Languages*, *Stud. Mod. Lang. Teach.*, 1930, 17, 97-145.

² Overman, J. H., *The problem of Transfer in Arithmetic*, *10th Yearb. Nat. Coun. Teach. Math.*, 1935, 173-185.

rules of procedure and were given explanations and reasons. All four groups were taught to solve the same problems during training. Then, tests of new material (in addition) were given to see the comparative transfer value of the four methods of teaching. The results are given in Table 60.

TABLE 60.—PERCENTAGE OF TRANSFER PRODUCED BY FOUR METHODS OF TEACHING ADDITION

Method of Teaching	Per Cent of Transfer
I. Demonstration	46.6
II. Generalization	67.6
III. Explanation.....	53.8
IV. Generalization and explanation...	63.8

Another experiment that illustrates the importance of the method of teaching on the amount of learning transfer was performed by Woodrow.¹ He compared two groups of college students, on memorizing tests after they had been given two different types of memory training, with a control group that had received no special training. The three groups were first equated on initial tests in memorizing.

TABLE 61.—COMPARISON IN PERCENTAGE GAIN OR LOSS OF THREE GROUPS OF COLLEGE STUDENTS AFTER DIFFERENT TYPES OF INTERVENING MEMORY TRAINING

Type of test	Per cent gain or loss(—)			Advantage over control	
	Control	Practice	Training	Practice	Training
Poetry . . .	—32.8	—29.1	—10.6	3.7	20.2
Prose. . . .	28.7	25.5	50.7	— 3.2	22
Facts.....	— 4.9	— 4.7	12.8	.2	17.7
Dates.....	29.	37.5	87.7	8.5	58.7
Vocabulary..	— .6	3.4	55.2	4	55.8
Memory span	6.7	— 5.7	20.3	—12.4	13.5
Average				.13	34.65

The control group was given no memory training. The practice group devoted eight periods (a total of 177 minutes) to memorizing poetry and nonsense syllables. The training group spent only a part (101 minutes) of their eight periods on memorizing, and the rest of their time (76 minutes) was devoted to a study of the rules for memorizing.

¹ Woodrow, H., The Effects of Type of Training upon Transference, *J. Educ. Psychol.*, 1927, 18, 159-172.

They learned about the "whole" method, about the value of self-testing and grouping, about secondary associations, etc. Then, each group was again tested. The results are shown in Table 61. The practice group was but little better than the control group, but the training group was vastly superior.

Certain conclusions regarding the transfer of learning would seem to be justified from this rather extensive research.

1. Learning will transfer from the learning situation to later situations of application if it is useful in itself. There is no justification for the old theory that learning develops mental powers that can function irrespective of the content of the learning. If the content of learning is not useful, there is but little future value in it. The more closely learning is related to situations of future use, the more that learning will transfer to those future situations.

2. Learning transfers more readily when the learner has superior mental capacity than when he has average or inferior mental capacity. The implication of this is that pupils of average and inferior mental capacities should be given more lifelike education and less of the so-called "cultural" kind. Unless children are taught "culture in use" it is largely wasted time.

3. The transfer of learning in American education has been affected adversely by two influences—first, the traditional curriculum, which has cultural prestige but is ineffective in transfer value, and second, a branch of the progressive-education movement, which promotes the idea that education is not preparation for the future (which they insist cannot be predicted) but enjoyable adjustment to the present. Regardless of the philosophical justification for these points of view, neither produces a type of education that has transfer value comparable to the more practical laboratory and lifelike education that gets the pupils ready for a future that is near enough to guide the content of learning so that a large portion of it is directly usable in life. Transfer takes place when education is for life as it is and not as it may be envisaged by some idealist. Fortunately, the tendency in education is toward more useful and practical training instead of the idealistic cultural training that was originally designed for gentlemen.

TESTS AND MEASUREMENTS

Tests are used in education for measuring aptitudes (or native capacities), achievement (or learning), and personality. In general they are objective (*i.e.*, they have but one right answer and can be graded by different people with the same results) and standardized (*i.e.*, they have been given to a large number of people so that tables

of norms, or answer frequencies, are available). To achieve objectivity, test items are usually stated in some manner that requires no writing. For example, true-false items are statements that the testee recognizes and labels as being either true or false. (Columbus discovered America in 1607.—True, False) Multiple choice items are statements that may be completed by any one of a number of alternate answers. The testee must recognize and choose the right one. (The sum of 5 and 8 is—10, 17, 23, 13, 14.) Completion items are those statements that are not finished and the testee must fill in the missing concepts. (Columbus discovered America in_____.) Matching items are usually arranged in two lists (*viz.*, a list of dates and a list of battles) and the testee must connect the items in one list with their mates in the other list.

Tests are standardized by being given to a large number of people. Then, tables of frequencies are constructed so that a score can be compared to the scores made by others. In fact any test, whether published or homemade, must have some sort of norms or the scores are meaningless. This is likewise true with data in any field. A child weighs 36 lb. This is meaningless unless we know how much other children of his age and height weigh. To standardize a test is to find out what scores other people make on it. A high score is high only when compared with the scores made by other people.

Also, published tests usually have satisfactory (or, at least, known) *reliability* and *validity*. A high reliability means that a test can be repeated with the same results. If a pupil makes a high score on a test one day and a low score on the same test the next day, it is then unreliable. The reliability of a test may be computed in various ways. It may be given to the same pupils on different occasions. However, so many other variables (physical condition, intervening experiences, etc.) may cause differences in scores that it is unwise to condemn a test on this basis. It is better to compare the score made on a part of the test, usually the even-numbered items, with the score made on another part of the test, the odd-numbered items. If half the test gives relatively the same score as the other half, it is judged to be reliable. Some tests have two forms, which are equated, and either form may be used. When pupils make the same score on both forms, taken at different times, the test is then said to be reliable.

The validity of a test refers to its worth or value in doing what it is supposed to do. If a history test measures historical knowledge, it is then said to be valid. The validity of a test is usually determined by comparing it with some other (presumably better) measure of the same characteristic. If the scores made on a history test compare

closely with the grades pupils make in a history course, this is evidence of validity.

Both reliability and validity of a test are expressed in coefficients of correlation. A reliability correlation indicates the relation of a test in comparison with itself. A validity correlation indicates the relation of a test in comparison with some criterion measurement of the same factor.

THE MEASUREMENT OF APTITUDES

An aptitude may be defined as a native or inherited capacity to learn. Musical aptitude is the capacity to learn music. Mechanical aptitude is the capacity to learn mechanical skill. Intellectual aptitude is the capacity to learn to think and to solve abstract problems. Aptitude must be distinguished from ability. Ability is the actual amount of one's learning, while aptitude is the limit of one's possibility to learn. Ability is what one has already learned to do; aptitude is what one can learn to do (see Fig. 9, Chap. III).

Intelligence Tests.—The aptitude most commonly measured in the field of education is intelligence, or mental capacity. The tests used are of two types—individual and group. Individual intelligence tests (originated by Binet) are given orally by the examiner to a single subject. The answers are recorded by the examiner. Group tests are usually given to a large number of subjects at the same time. Each subject records his own answers on either the test or an answer sheet. (See discussion of the first psychological test and the army tests in Chap. I.)

There are a number of ways of interpreting the raw score made on an intelligence test. One way is to translate it into mental age. This is done by comparing it with the raw scores made by average children of various chronological ages. For example, suppose that the average nine-year-old child makes an average raw score of 156 on a certain test. Then, any child making a score of 156 on that test may be said to have a mental age of nine regardless of his chronological age. A mental age of nine is indicated by a test score like that made by normal children of the chronological age of nine.

Then, if a child's mental age is divided by his chronological age, the resulting quotient is indicative of variation above or below normal and may be compared with other quotients obtained in the same way regardless of the ages involved. This is called the "intelligence quotient," or the I.Q. For example, if a child has a mental age of eight years and a chronological age of nine years his intelligence quotient would be .88 or, expressed without the decimal, 88. Since the quotient

is less than 100, it indicates inferior intelligence. Suppose that another child has a mental age of 10.6 years and a chronological age of 12 years; his intelligence quotient will also be 88. Merrill¹ suggests that when the 1937 revision of the Binet test is used the I.Q.'s obtained should be given the following interpretation:

140-169	Very superior
120-139	Superior
110-119	High average
90-109	Average
80-89	Low average
70-79	Borderline defective
30-69	Mentally defective

The percentile is also used to express intelligence level. Suppose that a test is given to 1,000 people. Then suppose that the scores are divided into 100 percentiles of 10 scores each, ranging from lowest to highest. The lowest 10 scores would be the first percentile, the next 10 scores would be the second percentile, etc. Each of the 100 percentiles would have a score range and an average score. Suppose that 156 is the average score for the 25th percentile. Then anyone subsequently taking the test and making that score would be in the 25th percentile, or less intelligent than 75 per cent of all those who have taken the test.

TABLE 62.—INTELLIGENCE SCORE EQUIVALENTS

	Below average			Mean	Above average			
Standard deviation .	-1.5	-1	-.5	0	.5	1	1.5	2
Centile rank	6.7	16	31	50	69	84	93.3	97.7
Army Alpha	16	27	42	61	84	111	138	162
Stanford M.A.	10.5	11.5	12.6	13.9	15.4	16.9	18.1	19

Raw scores on intelligence tests are often translated into standard scores, or unit distances, from the average (or mean) score. A standard score is an indication of the degree a raw score may deviate from the average. It is calculated from the standard deviation and always indicates plus or minus fractions of standard deviations from the average or mean. Often 50 is arbitrarily assigned to the mean and each standard deviation above or below is given a value of 10. A standard score of 35 would then indicate 1.5 standard deviations below the mean, or approximately the seventh percentile. Standard scores are comparable regardless of the differences in raw scores (which are not comparable). For example, a student may make a raw score of 156 on one

¹ Merrill, Maud A., I.Q.'s on the Revised Stanford-Binet Scale, *J. Educ. Psychol.*, 1938, 29, 641-651.

test and 287 on another. The first score may have a standard value of 62 while the second may have a standard value of only 47. Since standard scores are comparable, they can be added and the average score computed (which in the above case is 54.5).

The meaning of these various ways of interpreting raw scores and their relation to each other is shown in Table 62 and Fig. 21.

It has been found that scores made on intelligence tests are highly indicative of subsequent success in schoolwork. Pupils who make high scores usually do well in school while those who make low scores usually do poorly in school. For example, Terman¹ quotes a study by Dickson

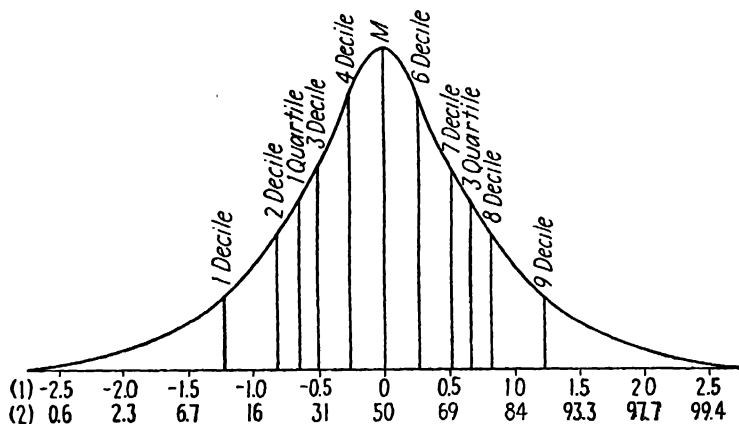


FIG. 21.—A normal distribution. (1) Standard deviations, (2) Centiles.

showing a correlation of .72 between mental age and school grades (See Table 63). However, this relationship varies with such factors as age, mental level, school level, school subjects, etc. The correlation is lower with older pupils, in the higher grades, and in nonacademic subjects (such as home economics, manual arts, etc.)

Intelligence tests were originally developed by Binet to distinguish between children with limited intelligence and normal children. They are still used for this purpose. Some schools put mentally handicapped children in the same class and teach them by methods that are not so appropriate for normal children. This is called "homogeneous grouping."

Mentally superior children are likewise often isolated in special classes and allowed to progress at a much faster rate than is possible with average children. Intelligence tests are used to select these superior children.

¹ Terman, L. M., *Intelligence of School Children*, p. 46, Houghton Mifflin Company, Boston, 1919.

Perhaps the greatest value of intelligence tests in education is in pupil guidance. Proper advice in problems of vocational choice, rate of school progress, school-subject selection, learning proficiency, etc., depends on the intellectual level of the pupil being advised. No teacher can give a child proper guidance without knowing something of the child's intellectual level. Even guidance in disciplinary problems depends on the intellectual caliber of the pupil involved. The value of tests of intelligence in educational guidance cannot be overemphasized. This use of intelligence tests is discussed at length in Chap. V.

TABLE 63.—RELATION OF MENTAL AGE TO THE QUALITY OF SCHOOL WORK IN THE FIRST GRADE (*N* 149)

Mental age	School grades				
	A	B	C	D	E
9.5 up	3				
9 to 9.4					
8.5 to 8.9	1	1			
8 to 8.4	2	1		1	
7.5 to 7.9		1	5		
7 to 7.4	3	7	10	6	
6.5 to 6.9		3	18	9	
6 to 6.4		1	14	6	
5.5 to 5.9			7	7	3
5 to 5.4			4	6	4
4.5 to 4.9			2	7	8
to 4 4				2	7

Mechanical Tests.—Tests of mechanical aptitude are often used in education to predict success in industrial arts. Correlations between scores made on these tests and school progress in various courses in industrial arts are equally as high as those between intelligence test scores and school progress in academic subjects. (These correlations range between .30 and .70 with the central tendency around .50.) Tests of mechanical aptitude may be samples of actual performance or pencil and paper tests of information.

Performance tests of mechanical aptitude are of various kinds. The assembly tests consist of articles that have been disassembled, and must be put together accurately in the shortest possible time. In the Minnesota Assembly test there are four boxes with 10 articles to be assembled in each box. For example, box *B* consists of a safety razor, a monkey wrench, a thumb-screw clamp, a jaw clamp, a spark plug, calipers, an electric plug, a pair of pliers, an iron handle, and a

mouse trap. There is a time limit and the score consists of the total number of proper connections made in assembling the various articles.

Spatial relations tests, sometimes called "form board" tests, usually consist of boards with a number of peculiarly shaped holes or recesses in them. Then there are pieces of wood that fit exactly into these recesses. The test consists of placing these pieces in their proper recesses in the shortest possible time.

Manipulation tests are of various kinds. Many of them are of the pegboard nature. Here, a board has a number of small, round holes drilled in it. There are a number of pegs, usually metal, that fit into these holes. The test consists of placing as many pegs as possible in the holes in a given time, first with one hand and then with the other. Another manipulation test consists of packing wooden blocks in a box, and another of sorting ordinary playing cards.

Other Aptitude Tests.—The measurement of musical aptitude has been the lifetime interest of Professor Seashore¹ at the University of

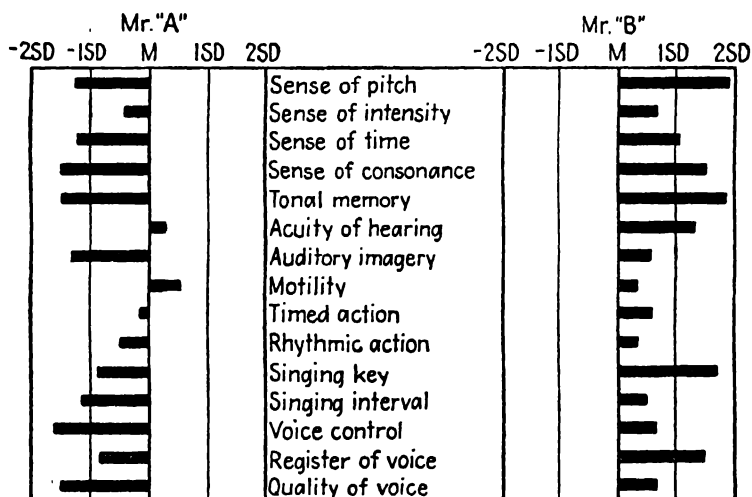


FIG. 22.—Musical aptitude profiles of two individuals. (Data from Seashore, *Psychology of Musical Talent*. Silver Burdette Company, New York, 1919.)

Iowa. His tests are widely used and are probably the best in this field. By the use of phonograph records various factors in musical aptitude are measured. Scores are obtained for tonal memory and the discrimination of differences in rhythm, timbre, time, intensity, and pitch. It has been found that training in music has very little effect on one's ability to pass these tests. Figure 22 shows the comparative musical

¹ Seashore, C. E., *Psychology of Music*, McGraw-Hill Book Company, Inc., New York, 1938.

aptitudes (in terms of standard deviation scores) of two individuals. Note that one has superior musical aptitude while the other is definitely inferior.

Tests have also been developed for the measurement of art aptitude, which, like musical aptitude, is composed of a number of factors. There is no one test that measures all of these factors. Various tests measure color sensitivity, sense of balance, sense of proportion, sense of perspective, richness of imagery, motor coordination and control, judgment of nuances of light and shade, etc. The Meier Art Judgment Test consists of a number of pairs of pictures of the same subject differing only in some minor respect that can be perceived only by those who have art aptitude. The McAdory Art Test consists of four pictures of the same subject differing in some essential art factor. Each picture has a score value that indicates the degree of art aptitude. (See Chap. XII for further discussion of both music and art tests.)

ACHIEVEMENT TESTS

The most common form of test used in education is the achievement test. The purpose of these tests is to find out how much the pupil has learned so that (1) further learning can be more intelligently directed and (2) rewards in the form of grades can be given more fairly. Consequently commercial tests, which can be purchased from publishing companies, have been developed in almost every subject-matter field. These are more satisfactory than homemade tests when accuracy of measurement is desired. They are usually more objective and more adequately sample the field covered than do homemade tests. They have been revised to improve reliability and validity. They have been given to other students so that norms are available and raw scores become meaningful. In other words, they are standardized. The use of standardized achievement tests is now a common practice in the field of education at all levels.

However, accuracy of measurement is not always the paramount factor in classroom testing. Often the main purpose in testing is to motivate pupils to greater learning effort. For this, the homemade test is just as good as the standardized commercial test. In fact, most teachers who use commercial tests limit their use to midterm and final examinations. At other times they construct their own tests.

Homemade Tests.—No test can do more than sample a block of learning. It is impossible to make a test all-inclusive. Consequently it is important to sample adequately all learning. Important learning must be sampled in proportion to its importance. When unimportant learning is oversampled it then carries more weight on a test than is

justified. Ruch¹ advises that a table of specifications be set up before a test is constructed. Each area of learning should be listed and the percentage of items on the test predetermined. Next, again according to Ruch, the test items should be drafted in preliminary form. These items should first concern the high spots, or important factors, and then the less important factors. An item should be stated in the form (multiple choice, completion, matching, true-false) most appropriate for the item. Then, the test should be edited and cut to desired length.

Many instructors keep a file of old test items and use them in the construction of new tests. If a record is kept of the difficulty of each item (*i.e.*, the percentage of those who marked it right) and of complaints regarding its interpretation, so that it can be altered accordingly, the use of old items in a test has the effect of partial standardization. They make a better test than new and untried items.

Authors of textbooks in some fields, including psychology, construct objective tests on each chapter and publish them at the time the book is published. Sometimes norms are given. These are better than homemade tests, just as appropriate, less expensive, and may be altered and reproduced in mimeograph form. Sometimes they are printed in a workbook with learning exercises and projects. Students can then use them as self-checks on learning progress.

TABLE 64.—GRADES GIVEN FOUR TEST PAPERS IN MODERN HISTORY BY TEN EXAMINERS

Test papers	Grades and frequencies																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A							2			1	2	3	2							
B				1					2	1	2		1	1	1					1
C	1	1		2			2	1	1	2										
D			1										2	1	1	3		1		1

The essay type of homemade test is no longer seriously considered by teachers who know testing limitations. In fact it is doubtful if essay exercises should be called tests at all. The principal difficulty is that they cannot be graded. Teachers do not agree as to what constitutes a good test paper or a poor one. Monroe² quotes a study in

¹ Ruch, G. M., *The Objective or New-type Examination*, p. 151, Scott, Foresman & Company, Chicago, 1929.

² Monroe, W. S., *Measuring the Results of Teaching*, p. 9, Houghton Mifflin Company, Boston, 1918.

which facsimile copies were made of a geometry paper and submitted to 116 geometry teachers for grading on a percentage basis. The grades ranged from 28 to 91. Approximately half of them were failing (below 70). Pressey and Robinson¹ quote a study by Hartog and Rhodes in which four essay examinations in modern history were graded by 10 university examiners. (The results are shown in Table 64.) There was very little agreement among these specialists in evaluating student efforts.

Standardized Tests.—When a homemade test has been tried out, revised, tried again, and then given to enough students to make the scores meaningful, it becomes standardized. Its reliability and validity have been calculated. Like the homemade objective test, it is easily administered, easily scored, and easily interpreted. Unlike the homemade test, it is published and therefore available in any quantity.

The first standardized test, published by Stone in 1908, was in arithmetic; and the second, published by Thorndike in 1910, was in handwriting. Today there are published standardized tests for every phase of school learning. Some tests cover a wide range of school subjects and are called Survey Tests, or Test Batteries. One such test is the Cooperative General Culture Test, and another is the Graduate Record Examination. Both of these have norms for undergraduate and graduate levels. Survey tests on the grade-school level are sometimes called "placement tests" because they are used to indicate the grade in which the child tested should be placed. Sometimes they are called "diagnostic tests" because they are used to indicate the subjects in which more learning should take place. They locate areas of inferior learning.

Again, the advantages of the standardized test over the homemade achievement test should be emphasized. The standardized test is more carefully constructed (items are in ascending order of difficulty), less ambiguous (and therefore more objective), more reliable, more valid, more easily interpreted (because it has been given to more people and the norms are more adequate), more available (because it is published), and more accurate in measurement. Standardized test results are comparable with those from other parts of the country, because the norms are usually national in scope.

PERSONALITY TESTS

Personality is the sum total of all those factors that affect the adjustment of an individual to his environment. It is not intangible.

¹ *Op. cit.*, p. 486.

However, it is broad and difficult to measure in its entirety. It is composed of physical factors, habits, attitudes, feelings, likes and dislikes, hereditary qualifications and limitations, socioeconomic-cultural status, etc. The word *personality* is used to designate any factor about an individual that affects or may affect the reaction or attitude of other people toward him.

It is obvious why personality is important in education. Young people are in the process of forming their personalities, and a large part of that formation is determined by what takes place in the schoolroom. Habits of relationships with others, countless attitudes toward both a world of objects and a world of ideas, patterns of emotional behavior, feelings of self-sufficiency, and other phases of personality are constantly in the process of formation and alteration. A child is not born with a personality. He develops it. It is the product of his living. Because so much of a child's living is in the schoolroom, a large part of his personality is there formed.

Personality measurement is yet in its infancy, and consequently its accuracy is limited. We are hardly yet removed from an age of charlatans, when personality was diagnosed by reference to the stars, or palm lines, or face contour, or cranial protuberances. (See Chap. I.) However, though present methods of personality measurement are crude, they are the best available. When properly interpreted, personality-measurement data increase the accuracy of human judgment. Personalities are better evaluated when all available data are used.

Acquaintance Ratings.—When personality is defined as those factors about an individual that affect the reaction or attitude of other people toward him, acquaintance ratings become a significant method of measurement. If a personality is good or bad depending on how it affects other people, it is then necessary to measure other people. Perhaps the most accurate description of a personality is the consensus of a number of close acquaintances.

The most common method of acquaintance rating is to describe a trait and then ask the raters to classify the rated personality as superior, average, or inferior. The following example illustrates this simple procedure:

What is the usual condition of this individual's health and physical vigor?
___Superior ___Average ___Inferior

It has been found that the reliability of acquaintance rating is increased by describing the degrees of variation more completely than by the use of single words. The following example illustrates this more detailed practice:

Is he tolerant of new ideas; is he open-minded and receptive to progressive suggestions?

- ____ He eagerly welcomes ideas and suggestions.
 - ____ He is open to ideas and suggestions.
 - ____ He is usually open-minded.
 - ____ He frequently objects to new ideas.
 - ____ He usually objects and opposes new suggestions.
 - ____ I am not acquainted with this individual in regard to this trait.
- Please record here a specific instance to support your judgment.

An interesting method of acquaintance rating was developed by Scott for use in officer's training schools during the First World War. Personality traits were described and each rater was then directed to select from his own personal acquaintance some individual who possessed the trait in the highest degree, another who possessed the trait in the lowest degree, another who was just average, another who was between the highest and average, and a fifth who was between lowest and average. The names of these individuals were written on the rating sheet. Then, the one to be rated was compared man to man with these individuals. Values were assigned to each degree and a personality score was thus obtained. The following extract from this rating scale will illustrate the method used:

Physical qualities.

Physique, bearing, neatness, voice, energy, and endurance. (Consider how this man impresses you in the above respects.)

Highest	John Brown	_____	(15)
High	Richard Black	_____	(12)
Average	Samuel Green	_____	(9)
Low	William White	_____	(6)
Lowest	James Gray	_____	(3)

Another procedure is to rate a number of people in comparison with each other on some single trait. If a teacher is rating the children in her classroom, she will roughly rank them in comparison with each other on some trait. Then at a later time, she will similarly rate them on another trait. By considering only a single trait and by comparing children with each other the accuracy of rating is greatly increased. This method is illustrated as follows:

Qualities of leadership. Consider the extent to which others seek to follow the person being rated. * (List your pupils in order of merit on this trait.)

No trait should be included in a rating scale if it can be more accurately measured in some other way. It is foolish to ask raters to estimate a person's intelligence, for example, when that trait can be better measured by tests for that purpose. Acquaintance-rating procedure is inaccurate at best and should be used to evaluate only those traits that cannot be more accurately evaluated in some other manner.

Trouble Questionnaires.—These are sometimes called "psycho-neurotic inventories." During the First World War a list of 116 questions, which could be answered by "yes" or "no," were prepared by Woodworth to distinguish between those personalities that had a well-adjustment history and those that were psychoneurotic. The following extract illustrates the nature of this questionnaire:

- | | |
|--|--------|
| 2. Do you usually sleep well? | Yes No |
| 19. Have you ever had fits of dizziness? | Yes No |
| 23. Do you have a great many bad headaches? | Yes No |
| 43. Do you make friends easily? | Yes No |
| 61. Are you troubled with the idea that people are watching you on the street? | Yes No |
| 66. Does it make you uneasy to sit in a small room with the door shut? | Yes No |
| 84. Do you ever feel a strong desire to steal things? | Yes No |
| 100. Did you ever have a strong desire to commit suicide? | Yes No |
| 114. Can you stand the sight of blood? | Yes No |

Many other trouble questionnaires of this nature have been developed in recent years. Perhaps the best, and certainly the most extensive, is the Minnesota Multiphasic test. More than 500 questions in this test are printed on separate cards. The procedure is to classify the cards in "true," "untrue," and "cannot say" groups. The questions are similar in nature to those listed above. The minor troubles revealed by this test indicate not only psychoneurotic tendencies but also the nature of these tendencies.

An interesting variation of the trouble questionnaire is the X-O, or cross-out, test developed by Pressey. This test consists of a number

of words in separate lists. The testee is instructed to cross out every word that suggests anything wrong, or every word that for any reason may have caused him to worry, or every word that is or suggests something unpleasant. Tables and norms permit the calculation of an idiosyncrasy score, or the number of responses that are not usually made by normal people. The following extract suggests the nature of this test:

Directions—Read through the twenty-five lists of words given just below and *cross out everything that you think is wrong*—everything that you think a person is to be blamed for. You may cross out as many or as few words as you like: in some lists you may not wish to cross out any words. Just be sure that you cross out everything you think is wrong.

1. Begging, smoking, flirting, spitting, giggling;
2. Fear, anger, suspicion, laziness, contempt;
3. Dullness, weakness, ignorance, meekness, stinginess;
4. Fussiness, recklessness, silliness, nagging, fibbing

Trouble questionnaires are perhaps more valuable as guides to interviews than as measuring devices. Reliability correlations are usually low due to the effect the mood of the testee has on the way he answers questions. They are valuable means of uncovering symptoms but not too accurate in measurement.

Experimental Tests.—Some tests put the subject in an experimental situation and then judge his personality by what he does in that situation. For example, Howells¹ devised a test of persistence, in which the testee was subjected to a series of graduated pain stimulations. The test had a reliability coefficient of .87 and correlated with intelligence .09 and with university grades .37.

Cushing² attempted to measure perseverance in small children by assigning them difficult or impossible tasks (inserting a bent key into a lock, dropping marbles through a hole in a box, etc.) and then observing how long they continued to try to accomplish the task.

Downey³ devised a test in which the subject was asked to perform a number of tasks under certain conditions on the assumption that he would reveal certain personality traits in so doing. For example, to measure coordination of impulses the subject was asked to "write on a short line (3 cm.), just as rapidly as you can, the words 'United States

¹ Reported in *Proceedings of Ninth International Congress of Psychologists*, p. 229. Psychological Review Co., Lancaster, Pa, 1930.

² Cushing, H. M., A Perseverant Tendency in Pre-school Children, *Arch. Psychol.*, 1929, No. 108.

³ Downey, June E., *Downey Group Will-temperament Test*, World Book Company, Yonkers-on-Hudson, New York, 1929.

of America.' There are two things you must do: write very rapidly, and keep from running over the line." To measure flexibility the subject was asked to "write 'United States of America' in a style very unlike your own. Change your writing so that none of your friends would know it." However, the test was found to be so low in reliability that it was never more than an interesting oddity.

Perhaps the best known battery of experimental personality tests was devised by Hartshorn and May.¹ They measured cheating, stealing, and lying by setting up situations where the child could choose between honesty and deceit. For example, to measure stealing children were given small boxes in which there was one quarter, four dimes, four nickels, and four pennies. Problems were given in counting money to cover up the real purpose of the test. The children were then directed to "pass the boxes to the middle aisle" where they were collected in a basket. Each pupil had an opportunity to steal if he wished. Each box was secretly numbered so that those who stole could be identified. Cheating and lying were measured in similar ways.

Free association tests to locate emotional complexes (and to detect lying) are also examples of experimental tests of personality. The individual being tested is given a list of words and asked to respond to each with the first word he thinks of. If his response is a variation from a list of normal responses, already discovered by having given the test to people known to be normal, the conclusion is that the individual has abnormal tendencies.

Perhaps most interesting of the experimental types of personality tests are the projective techniques. In one such test (by Rorschach) the subject is shown a series of ink blots and asked to tell what he sees in each blot and what it reminds him of. His responses are then compared with norms to discover the atypical ones. A somewhat similar test (Thematic Apperception Test) uses both ink blots and music, to arouse fantasies, and an assortment of toys that are to be used in the creation of a dramatic scene.

These fantasy tests are currently attracting wide attention in the psychological world but are not objective enough to yield metrical measures. They are perhaps valuable for diagnostic purposes (see Chap. XVIII for further discussion).

SUMMARY

Learning is affected by many conditions. Some can be controlled to facilitate it (motivation, emotion, methods of study) and others are

¹ Hartshorn, H., and May, M. A., *Studies in Deceit*, The Macmillan Company, New York, 1928.

immutable (stages of maturation and aptitude). The real value of learning is usually not its immediate use but its future use. This transfer depends on whether or not the learning is for future use, the intelligence of the learner, and the method of learning.

Testing is an essential part of the educational process. It is used to measure aptitudes, the amount of learning (abilities), and personality traits. Psychological measurements are in the developmental stage and must be interpreted with caution. They indicate variations from the average and not absolute amounts. Tests are useful in providing data for more intelligent judgment but are not answers in and of themselves. They are of most value when used by those who understand the basic mechanics of their construction, use, and interpretation.

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the appropriate vocational opportunities. Leonard and Tucker¹ made a survey of the extent of vocational counseling in 870 American high schools. Their results are shown in Table 66.

TABLE 65.—PERCENTAGE WHO WOULD CHANGE CAREER IF LIFE COULD BE LIVED OVER AGAIN
(N 5,000)

	Change	Satisfied	Depends
Men.....	43	37.9	19.1
Women.....	37	43.5	19.5
Professional people	29	53.3	17.7
Factory laborers	61.3	21.3	17.4

TABLE 66.—VOCATIONAL COUNSELING IN HIGH SCHOOLS
(N 870)

By whom	Per cent of schools	
	Regularly	Occasionally
Principal.....	27	41
Counselor.....	64	7
Home room teacher	18	36
Teacher.....	13	42
Vice-principal	15	20
Dean of girls	20	11
Dean of boys..	12	7
Vocational coordinator	14	4
Others	8	5

Most colleges give courses to train vocational counselors, and many states require such specialized training for certification in vocational counseling. However, there is a difference between vocational counseling based on scientific individual analysis and scientific occupational analysis, and vocational counseling based on opinions. Even states that require certification for vocational counselors often do not require enough scientific training to enable them to do careful work. Perhaps no other phase of educational work is done so glibly by teachers who are so poorly trained, and on the basis of such inadequate information, as is vocational counseling.

It is now obvious that two factors are involved in vocational guidance—the individual and the vocation. Two questions must be

¹ Leonard, E. A., and Tucker, A. C., *The Individual Inventory in Guidance Programs in Secondary Schools*, U.S. Off. Educ., Voc. Div. Bull. 215.

answered: What special aptitudes does the individual have? What special aptitudes does the occupation require? Two techniques must be developed—how to analyze the individual and how to analyze the occupation. Consequently, this chapter is in two parts—one concerning the analysis of the aptitudes of the individual and the other concerning the analysis of the requirements of the occupation.

ANALYZING THE INDIVIDUAL

It was pointed out in Chap. I that an individual's aptitudes cannot be determined by astrology, phrenology, graphology, or physiognomy. In spite of their popular appeal and general usage, they are the "gold bricks" of psychology. They constitute the psychological underworld. In Chap. IV it was emphasized that aptitudes are innate limitations beyond which abilities cannot go. They cannot be measured directly but must be inferred or predicted from a measurement of an individual's abilities in comparison with the same abilities of other people. For example, intelligence can be predicted with fair accuracy when scores on tests of vocabulary size, speed of learning, comprehension, numbers calculation, etc., are compared with the scores of other individuals of the same age and experience. Consequently, ability analysis consists of giving an individual tests, which have been standardized on other people, and then comparing his scores with the norms. For example, if he makes a score on a musical aptitude test equal to that made by the highest 1 per cent of all those who have taken the test, it can be assumed that he has very superior musical aptitude.

CATEGORIES OF QUALIFICATIONS

There is considerable disagreement among psychologists regarding the basic aptitudes, or primary mental abilities. Thurstone¹ has used a procedure of factor analysis, on the results of a battery of 57 different tests, and has concluded that there are eight basic mental factors. These are briefly stated as follows:

1. The *space* factor, or the ability to judge space and form accurately.
2. The *perceptual* factor, or the ability to pick out detail quickly, even when it is buried in irrelevant material.
3. The *number* factor, or the ability to perform the simple arithmetical processes (addition, subtraction, multiplication, and division) quickly and accurately.

¹ Thurstone, L. L., *Primary Mental Abilities*, *Psychometr. Monogr.*, 1938, Vol. 1, No. 1.

4. The *verbal relations* factor, or the ability to read and interpret sentence meanings.
5. The *word* factor, or the ability to spell and define simple words.
6. The *memory* factor, or the ability to memorize.
7. The *induction* factor, or the ability to discover some basic principal that is common in a classification of items.
8. The *deduction* factor, or the ability to apply a general principal to specific cases.

In the Minnesota Occupational Rating Scales, only six human abilities are listed and named according to their function. (This scale also designates the amount of each ability necessary for success in some 430 occupations.) They may be defined as follows:

1. *Academic*—the ability to understand and manage ideas and symbols.
2. *Mechanical*—the ability to manipulate concrete objects and to deal mentally with mechanical movements.
3. *Social*—the ability to understand and manage people.
4. *Clerical*—the ability to do rapidly and accurately detailed work, such as checking, classifying, filing, etc.
5. *Musical*—the ability to discriminate musical sounds and to give some form of expression through them.
6. *Artistic*—the ability to create artistic forms of merit and to evaluate forms already created.¹

A classification of traits and abilities, for which there are satisfactory testing instruments, used at the University of Denver in vocational guidance, consists of ten categories. They are stated in Table 67 but can be defined only in terms of the tests used to measure them. For example, mechanical ability means one thing when measured by the Minnesota Assembly Test, another thing when measured by the Crawford-Bennett Point Motion Test, and still another when measured by Grove's modification of the Kent-Shakow Form Board. Perhaps it is more accurate to say that the ten categories are classifications of test results (as illustrated later in this chapter) that make an interpretation of those results less difficult.

No doubt a better analysis of ability categories than that shown in Table 67 could be devised. Nevertheless, it will serve in this chapter to illustrate how human qualifications for an occupation can be analyzed.

¹ Taken from Paterson, D. G., Gerken, C. d'A., and Hahn, M. E., *The Minnesota Occupational Rating Scales and Counseling Profile*, Science Research Associates, Chicago, 1941.

TABLE 67.—QUALIFICATION CATEGORIES AND ILLUSTRATIVE TESTING INSTRUMENTS

Qualification Category	Tests
1. Intelligence:	
a. Verbal	Ohio State Psychological Examination
b. Quantitative	Parts of Carnegie Mental Abilities Test
c. Thinking	Watson-Glasser Test of Critical Thinking
d. Common sense	Cardell Test of Practical Judgment
2. Education	School Grades
	Graduate Record Test
	Cooperative General Culture Test
3. Social:	
a. Introversion	Neymann-Kohlstedt Introversion-extroversion
b. Social intelligence	George Washington Social Intelligence Test
c. Emotional maturity	Pressey Interest-Attitude
	Johnson Temperament
4. Personality	Adams-Lepley Personal Audit
	California Personality
	Minnesota Multiphasic
5. Mechanical:	
a. Dexterity	Purdue Peg Board
	O'Connor Tweezer
b. Manipulation	Minnesota Assembly
c. Information	Stenquist Mechanical Aptitude
d. Engineering	Crawford-Bennett Point Motion Test
6. Clerical:	
a. Checking, filing, etc.	Minnesota Test for Clerical Workers
b. Stenography	Blackstone Stenographer's Proficiency
c. Secretarial	N.I.I.P. Clerical Test
7. Musical	Seashore Musical Aptitude
8. Art:	
a. Appreciation	Meier Art Test
b. Aptitude	Lewerenz Tests of Abilities of Visual Art
9. Vocational Interests	Kuder Preference Record
	Strong Interest Test
10. Miscellaneous:	
a. Sensory acuity	Color Vision Test
b. Visualization	Dynamicube Test
c. Law aptitude	Stoddard and Ferson Law Aptitude
d. Nursing aptitude	Moss and Hunt Aptitude for Nursing Test
e. Medical aptitude	Moss Medical Aptitude

TESTS OF QUALIFICATIONS

Two good rules to follow in psychological testing are: never use a test unless you have definite need for the data; then, select the test that appears to be the best instrument for providing those data. In vocational guidance there are never too many significant data. Any test that will provide accurate and relevant data can be used appropriately. The limit is only the cost in time and money. However, if

a boy has always wanted to be a lawyer, if his interest tests substantiate these wants, if his intelligence tests show him to be in the upper centiles, if his personality tests show no traits that would obviously interfere, and if he has the money to finance a law education—there is but little point in testing him further in irrelevant qualifications, such as dexterity, music, and art. Tests afford a qualification picture of an individual; but all items in such a picture are not significant for all occupations. In other words, neither the presence nor absence of some traits is significant for success in some occupations.

The real worth of a test in vocational guidance is determined by using it on both successful and unsuccessful members of an occupation. If it distinguishes between them, it is of worth. If not, the data it would provide are insignificant for that use. The fact that an intelligence test, for example, is found to be valuable in selecting successful candidates for an engineering school does not prove that it will be equally valuable in selecting candidates for a medical school, even though intelligence is known to be a significant trait in both vocations. A test should always be tested for its worth in the specific use to which it is put. Some tests have been evaluated for selecting candidates for specific occupations; others have not.

Fortunately, psychological tests are constantly being developed and improved. They are ever being used and evaluated in new situations. As a result, they are sometimes discarded, sometimes modified, and sometimes used further with more intelligent interpretation. However, until psychological tests have improved far beyond their present status, it will be necessary for vocational counselors to be especially well trained in their use. A human trait must be measured with many tests and the data must be very cautiously interpreted. This can be done only by an expert.

It should be noted that the amount of testing in vocational counseling depends somewhat on the age of the person being counseled and the experience he has already had. An older person will have eliminated many occupational possibilities by actual experience and loss of interest. He will have certain other marked vocational interests and will want to know if he has the necessary qualifications. Testing will be limited, therefore, to the specific qualifications involved. There will be no necessity for exploratory testing.

On the other hand, a younger person usually has no stable vocational interests and no background of occupational experience. He is, vocationally speaking, virgin territory with no signposts to guide the counselor. Obviously, the testing done will have to be exploratory and general. A survey will have to be made of all his possible qualifications.

All data will have possible significance. Overtesting will be impossible. Not until trends begin to point to certain occupational fields can any possible ability be neglected.

This suggests that vocational guidance is really a continuous affair. It begins with a test survey of undeveloped and immature aptitudes and unites with this a wide study of all the occupational fields. As the pupil grows older, his aptitudes become more pronounced and his interests more localized. All this should be indicated by test data as well as by opinion. The counselor should be sure that the pupil himself is getting a more detailed and accurate picture of his own qualifications, as well as of the jobs in an appropriate occupational field. As the pupil becomes older, he becomes more of a specialist concerning his own vocational problem. He learns what data are significant and what data are still needed. He helps plan the further solution of his own problem. The counselor becomes less and less essential as the pupil (who by now has become a young man) learns more and more about himself in relation to the occupational world into which he must fit.

INTERPRETING TEST SCORES

As was pointed out in Chap. IV, a test score has no meaning except in relation to the scores of other people on the same test. Suppose that a student makes a score of 390 on a test that has 500 possible points. Is this score high, low, or average? Now suppose that we give the same test to 100 classmates of this student. They make scores ranging from 300 to 400 with an average of 350, let us say. It is now obvious that the score 390 is above the average. Suppose that we rank all the scores from highest to lowest and find that 390 is third from the highest. We now know what the score means.

When hundreds of scores on a test are arranged in order from highest to lowest, they are often divided into 100 groups called "centiles," or into ten groups called "deciles," or into four groups called "quartiles." A new score is then interpreted in terms of quartile, decile, or centile (also called "percentile"). Highest scores are located in the 99th centile, or the 10th decile, or the 4th quartile. Scores are usually distributed on each side of the average (or 50th centile, or the 5th decile, or the 2nd quartile) in a fairly symmetrical manner and with steadily decreasing frequency. This means that the score difference between the 41st and 50th centiles is not so great as that between the 1st and the 10th centiles (see Fig. 21).

Now suppose that the student mentioned above takes another test, which has only 80 possible points, and makes a score of 67. How

does this score compare with the score on the first test? Obviously, it is impossible to compare the scores directly. Again it is necessary to interpret this score in relation to other scores on the same test. By referring to a table of scores made by students who have already taken the test, we find that 50 is the average score and 67 is in the 95th centile. Since the score on the first test was in the 97th centile, we can now conclude that the student made high scores on both tests.

It should be observed that in psychological measurement the base line is the average score, rather than zero as in most other forms of measurement. A psychological test score has meaning in terms of its distance above or below the average, instead of above or below an absolute zero. When a number of tests are given to the same individual and a composite picture of his qualifications is desired, a graph can be made that shows all his scores in relation to each other. Figures 23 and 24 show the profiles of two students in relationship to the average scores made on the various tests.

A table of scores made on a test (usually called a table of "norms") is often misleading unless proper recognition is made of the other qualifications of those whose scores are so listed. For example, the table of norms used for interpreting the score of John Doe in Fig. 23 on the Ohio State Psychological Examination was constructed from scores of college freshmen. John Doe was a senior. His centile, if compared with seniors, would probably be considerably lower than that indicated in the profile. In fact his centile on the American Council on Education test, which he took as a freshman, indicates that he is overrated by the Ohio State test. Another illustration is the Crawford-Bennett Point Motion Test. The norms here were scores made by engineering students. John Doe was a liberal arts student. Certainly he would have ranked higher if his score had been compared with those of liberal arts students. If the norms for either of these tests had represented the general population, of course John Doe would have ranked much higher.

The point cannot be overemphasized that the use of tests is fundamental in good vocational guidance, yet they cannot be interpreted by one who has not had specialized training in their use. The average school teacher cannot give the child intelligent vocational guidance without the information afforded by psychological tests, but neither can she use tests and interpret them accurately enough to be of guidance value. Good vocational guidance necessitates specialized training in the use of psychological techniques of measurement.

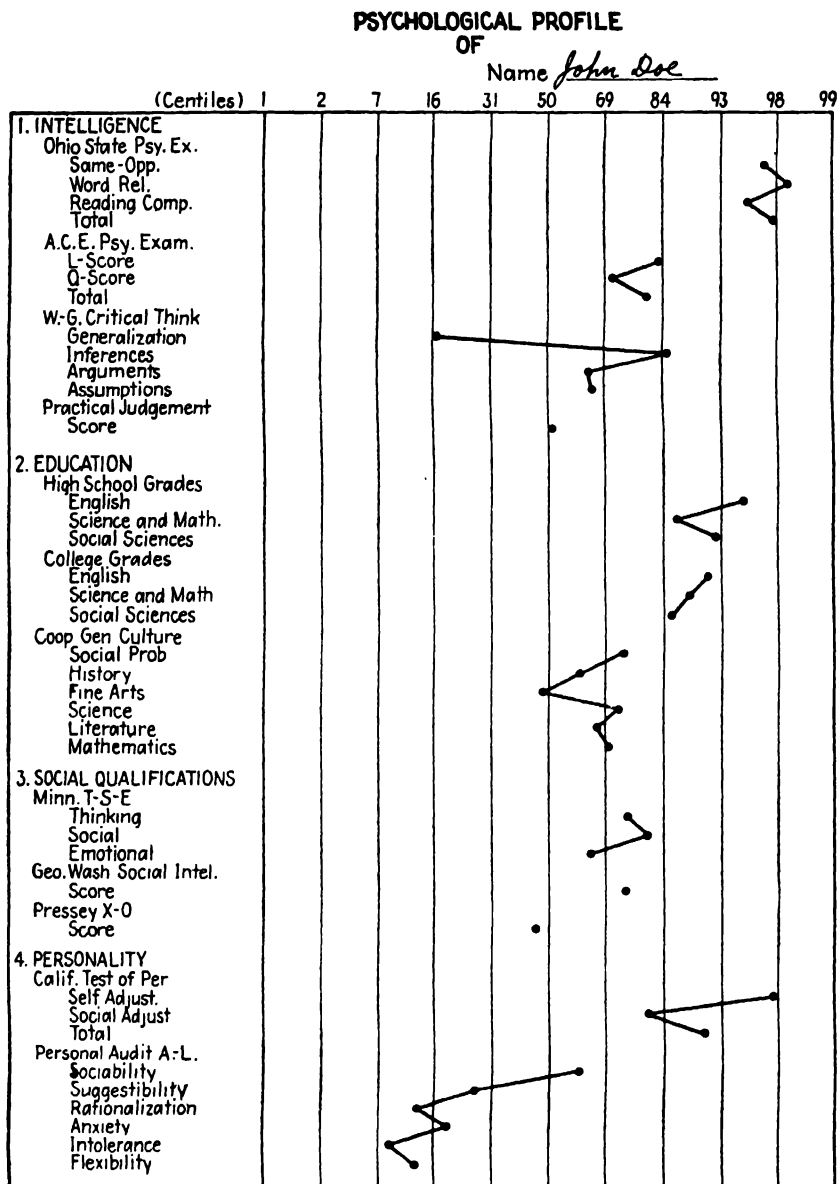


FIG. 23.—Test profile of a university male student.

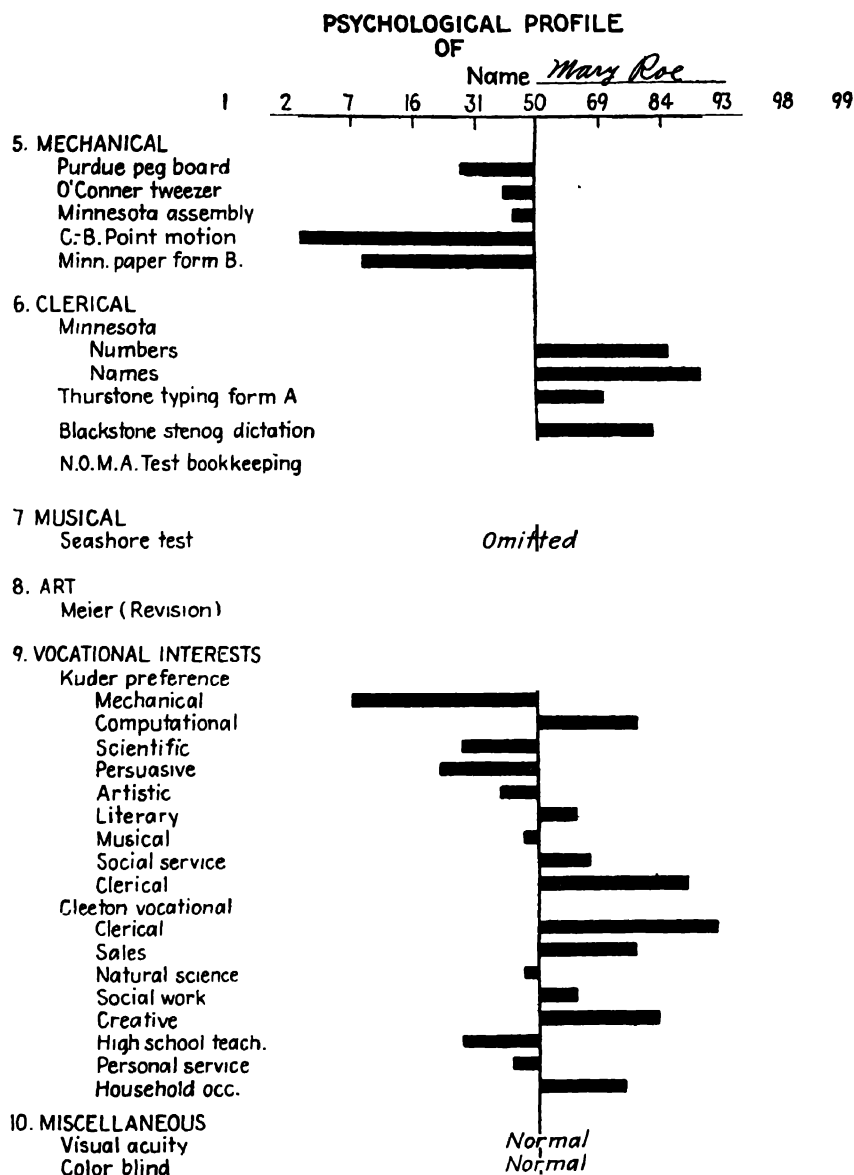


FIG. 24.—Test profile of a university female student.

COURSES IN VOCATIONAL GUIDANCE

There are two kinds of vocational guidance courses—those that have the primary purpose of helping the student to analyze his own qualifications and to choose an appropriate occupational field, and those that have the primary purpose of teaching the student to become a vocational counselor himself. Enrollment in courses of the latter type is limited to psychology students who have had the necessary prerequisite courses in testing techniques. Such courses are concerned with guidance techniques and need not concern us here. Courses of the former type are designed to make vocational guidance available to a larger number of students than is possible by the usual individual guidance procedures. Tests of those abilities that are significant in all occupations (such as intelligence, personality, interests, etc.) can be given to individuals in groups with but little more time and effort than is necessary to test individuals singly. Group vocational guidance, supplemented by individual guidance, is no less effective and much more economical than is individual vocational guidance.

The subject matter in a vocational guidance class differs considerably from that of the usual class. There is no cultural heritage to be learned and there are no skills to be formed. There is no textbook to be followed and there are no examinations to pass. Instead, the subject matter is the student himself. The problems dealt with are his own problems. He literally follows the old adage that “the proper study of mankind is *man*.” The content of a course of this nature is rather interestingly described in the preface to the term paper of one of the writer’s students. It is quoted literally.

This term paper is part of the semester’s work in the course Vocational Psychology. The title of the paper—MYSELF—is all that it implies. It is all about me and how I am fitted for my chosen occupation. It is about me, by me, and for me. The paper is in three parts—first, a statement of test results and their interpretation; second, an analysis of the requirements of the occupation (social work) in which I am most interested; and, third, an attempt to predict how I will succeed in this occupation.

I have noticed that most books are dedicated to someone who presumably is deserving. I feel it fitting that I should dedicate this paper to someone who is deserving. I hereby dedicate it to *myself*. After all, I have been the subject matter, I have done the work, and I hope I will get the benefit.

S. S.

There is, of course, danger that undergraduate students who have had little or no training in psychology will misinterpret test results in spite of all an instructor can do to prevent it. However, frequent

individual conferences on the significance of individual profiles, emphasis on the importance of vocational plans being constantly adjusted to fit new developments, and the requirement of a very careful summarizing statement (such as term paper) that meets the approval of the instructor, will reduce misinterpretations to a minimum. But certainly a scientific study of vocational qualifications, even assuming errors, will not increase a student's misconceptions about himself. He has already made an evaluation of his vocational qualifications and on the basis of but little objective evidence. A course in vocational guidance will motivate additional study of a problem that may remain yet unsolved but can hardly become more unsolvable.

The cost of the tests and materials used in a course in vocational guidance is often paid by the student in lieu of a textbook fee. Sometimes a laboratory fee is charged to meet these expenses. However, regardless of how paid, the costs of a course in vocational guidance are always insignificant when compared with what the same amount of testing and counseling would cost on the professional market. Then, the value in reducing vocational misfits, both to society and to the individual involved, is beyond estimate.

ANALYZING THE OCCUPATION

Just as individuals are analyzed to discover what qualifications they possess, so are occupations analyzed to discover what qualifications are needed. Some people have more intelligence, for example, than 98 per cent of other people, and some occupations need more intelligence than 98 per cent of other occupations. The scarcity of human superiority in certain traits is often matched by the limited need for those traits in the occupational world. Likewise, the abundance of certain other traits is matched by the abundant need for those traits. Almost any pattern of human traits possessed by an individual has a counterpart in the need of some occupation. The problem of vocational counseling is to fit peculiar patterns of individual qualifications into correspondingly appropriate occupational needs.

OCCUPATIONAL ABILITY PATTERNS

The original attempts at occupational analysis were subjective opinions that could not be, or were not, substantiated by metrical data. For example, Munsterberg analyzed occupations by armchair procedure (illustrated in Table 68) and then by similar "expert judgment" tried to select individuals to fit. Theoretical individuals were fitted to theoretical occupations. One wonders just what is

TABLE 68.—MUNSTERBERG'S ANALYSIS OF TWO OCCUPATIONS

Occupation	Abilities required	Duties performed	Personal motives	Social interests
Journalist	Sociability Energy Memory Accuracy Judgment Observation	Typewriting Quick expres- sion Forceful style	Honor Truth Influence Salary Progress	Politics Education Information Entertainment
Domestic worker	Joyful work Energy Patience Teaching Economy Physique	Housekeeping Sewing Cooking Nursing House furnish- ing	Morality Beauty Position Home life Family welfare	Comfort of community Family comfort

meant by some of the traits and if the analysis is always accurate. Is beauty a necessary personal motive of a domestic worker?

The most recent procedure is to analyze occupations by a careful enumeration of the duties performed, the training and experience required, the conditions of work, the dangers involved, the human traits found to be necessary, etc. (see Job Analysis in Chap. XIV). The *human* traits essential on a job are often discovered by testing the qualifications of successful workers in comparison with the qualifications of the unsuccessful, or mediocre, workmen on the same job. Sometimes workers on one job are compared in qualifications with workers on other jobs. Both these methods were used by Dvorak¹ in her study of differential ability patterns. She compared the ability patterns of the employees of various occupations, as indicated by scores on a battery of tests, with each other. Some of her results are shown in Figs. 25 and 26. She also studied the relation of superior groups of employees to inferior groups in the same occupation. Figure 27 shows the relation of the ability pattern of superior women office workers to that of inferior women office workers. Then she compared the ability patterns of selected groups of employees in the same occupation but in different locations and under different conditions. For example, Fig. 28 shows the ability pattern of private duty nurses as compared with that of nurses in institutions.

Data obtained by Dodge² substantiate Dvorak's study in that

¹ Dvorak, Beatrice J., *Differential Ability Patterns*, Univ. Minn. Bull. Emptyl. Stab. Res. Inst., Vol. III, No. 8.

² Dodge, A. F., *Occupational Ability Patterns*, Teach. Coll. Contr. Educ., No. 658.

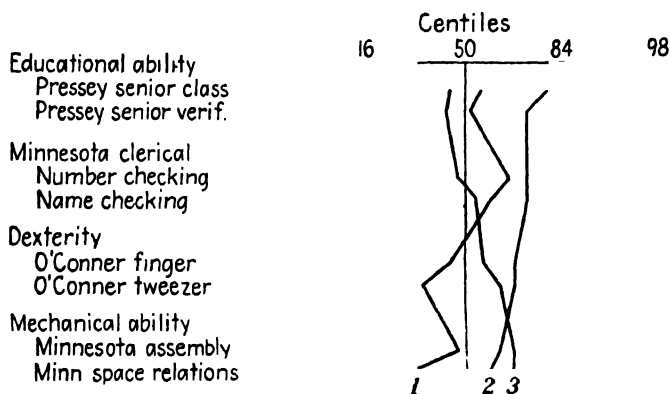


FIG. 25.—Ability patterns characteristic of (1) policemen, (2) draftsmen, and (3) ornamental iron workers.

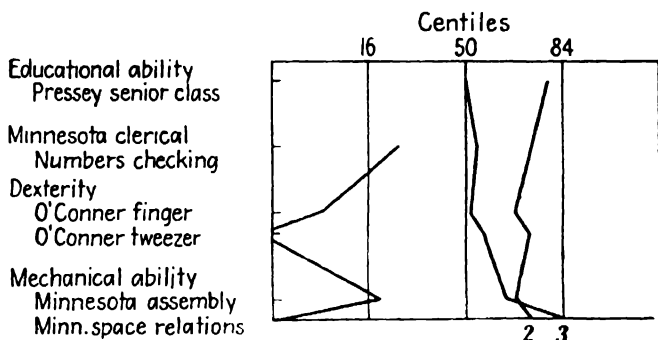


FIG. 26.—Ability patterns characteristic of (1) common laborers, (2) manual training teachers, and (3) garage mechanics.

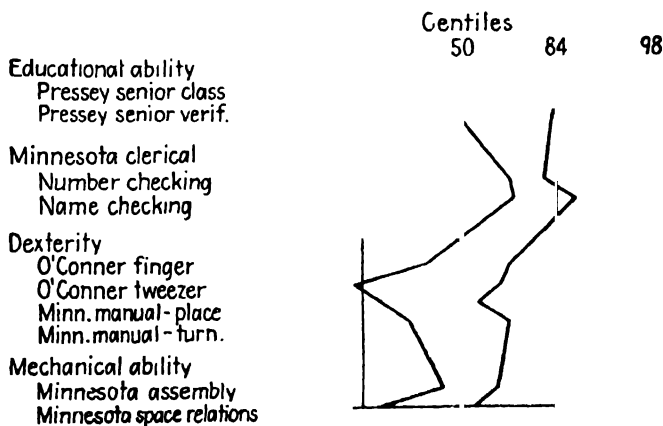


FIG. 27.—Ability pattern characteristics of (1) inferior women office clerks, and (2) superior women office clerks.

he also found "significant differences between average scores of the various occupational groups." However, both authors warn that all occupational groups have such wide distributions of scores on all tests

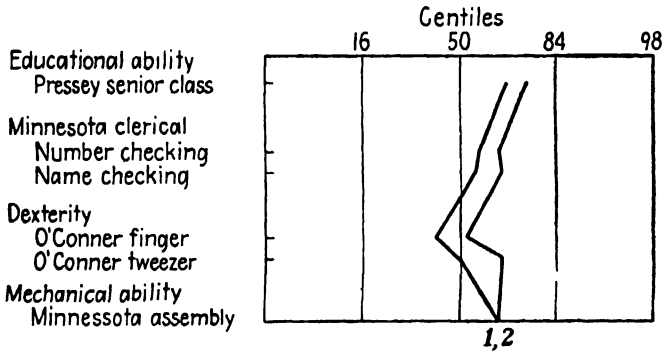


FIG. 28.—Ability pattern characteristics of (1) private duty nurses and (2) institutional nurses.

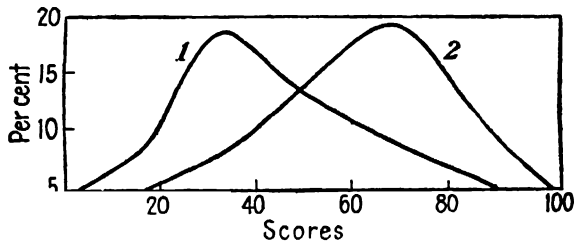


FIG. 29.—Distribution of scores of Pressey senior verification test for (1) garage mechanics and (2) office clerks (men).

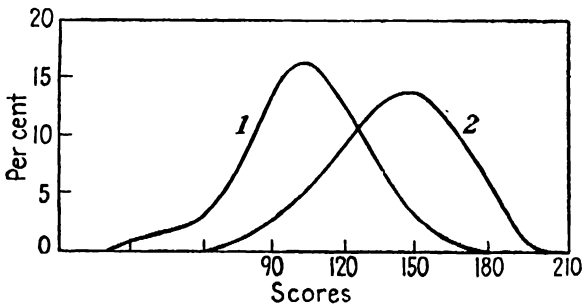


FIG. 30.—Distribution of scores on Minnesota clerical (numbers checking) for (1) salesmen (retail) and (2) office clerks (women).

and overlap with each other to such an extent that conclusions for use in individual vocational counseling must be made with caution. As suggested by the overlapping of score distributions on the two tests illustrated in Figs. 29 and 30, individuals of almost any pattern of

abilities are found to be employed in almost any occupation. Perhaps the proper conclusion to draw from such studies is that significant inferiority to the occupational average on any ability constitutes a handicap that at least should be recognized by the individual concerned.

It is obvious from the data here presented, which are typical of what data exist, that too few occupations have been studied by too few tests to make occupational ability patterns useful in vocational guidance. In addition, patterns overlap; they are not constant for all locations of the same occupation (see Fig. 28); and they change with variations of labor supply. The vocational guidance counselor must look elsewhere for a more helpful means of vocational analysis.

THE MINNESOTA OCCUPATIONAL RATING SCALES

The fact that a sufficient number of occupations has not been scientifically analyzed does not reduce the practical need in vocational counseling for a knowledge of the specific requirements of a wide range of occupations. Relatively, in general terms, how much intelligence is required to be a draftsman, for example? How much clerical ability is required to be a successful small business executive? How much mechanical ability should a landscape gardener have? So far, these and similar questions can be answered only by the "polled judgments of vocational psychologists." *The Minnesota Occupational Rating Scales* list the minimum levels of six human abilities necessary for success in 430 occupations. The six human abilities have been stated earlier in this chapter. There are four levels described for each of the six abilities. The four levels of academic ability, for example, are described as follows:

Level A (Professional, Semiprofessional, and Executive Occupations) Requires superior abstract intelligence with training equivalent to college graduation from a first-class institution, or to two or three years of college, or to that of an executive of a moderately large business. Ability for creative and directive work is implied. Includes top decile in general population.

Examples: Lawyer, college president, president of a large manufacturing concern, executive of a moderately large business, veterinary doctor, high-school teacher, etc.

Level B (Technical, Clerical, Supervisory Occupations) Requires high average abstract intelligence equivalent to high-school graduation and/or technical school or junior college. Includes 76 to 90 percentile.

Examples: Minor executive (foreman, department heads) or highly technical work often involving dealing with abstract classifications and details, such as railroad clerks, some retail dealers, photographers, telegraphers, shop foremen, stenographers, etc.

Level C (Skilled Tradesmen and Low Grade Clerical Workers) Requires average abstract intelligence with training equivalent to vocational high school. Work demanding specialized skill and knowledge; tasks mostly of a complicated but concrete nature requiring specialized training. Includes 26 to 75 percentile.

Examples: Auto mechanic, stationary engineer, file clerk, typist, etc.

Level D (Semiskilled and Unskilled Occupations) Requires low average or slightly below average abstract intelligence with training equivalent to eighth grade or less. Work demanding a minimum of technical knowledge or skill but may involve special abilities, such as dexterity in the performance of repetitive and routine work. Includes 1 to 25 percentile.

Examples: Packer in factories, operatives in factories (operate machines but do not understand principles and are unable to repair or set up the machine), lowest grade of clerical work (numbers sorters, deliverymen), or routine manual work under supervision requiring no skill or technical knowledge (day laborers, railroad section hands, etc.).

TABLE 69.—MINNESOTA OCCUPATIONAL RATING SCALES

Occupation	Abilities					
	Academic	Mechanical	Social	Clerical	Musical	Artistic
19. Auctioneer, general	C	D	A	C	D	D
25. Banker and bank officer, small town	A	D	B	A	D	D
51. Cartoonist, newspaper or magazine	B	C	B	D	D	B
88. Day laborer	D	D	D	D	D	D
92. Dentist, great, in city	A	A	B	C	D	D
124. Engineer, electrical, college training	A	A	D	B	D	D
158. Hairdresser, manicurist, employed in shop	D	C	C	D	D	D
192. Laundry owner and manager, of average laundry	B	C	B	C	D	D
249. Oil well driller	D	B	D	D	D	D
277. President, college	A	D	B	B	D	D
313. Retail dealer, florist	C	D	C	C	D	C
339. Salesman, auto	B	C	A	C	D	D
384. Teacher, high-school (college graduate)	A	D	B	C	D	D
405. Undertaker, funeral director	B	C	B	C	D	D

The other five abilities (mechanical, social, clerical, musical, and artistic) are similarly analyzed. Then, each of 430 occupations is analyzed and the "minimum level of ability required for job competition" is indicated by the appropriate letter symbol. Table 69 illustrates the procedure.

Since there are six abilities considered and four levels of each, there are 360 possible ability patterns. Actually, but 155 were found and 85 of these were for single occupations. That means that in the 345 remaining occupations there were but 70 ability patterns. Sometimes a single ability pattern was found in as many as 34 occupations. As illustrated in Table 70, many occupations are "sisters under the skin."

TABLE 70.—ABILITY PATTERNS AND RELATED OCCUPATIONS

Patterns						Occupations
Aca- demic	Me- chan- ical	Social	Clerical	Musi- cal	Artis- tic	
A	C	B	B	D	D	Land owner, operator, large scale Manager or superintendent, average size factory Officer, army Official manufacturing, head of large company Professor, university, A.M. or Ph.D.
B	D	C	B	D	D	Agent, express and freight Appraiser, taxes, insurance, etc. Conductor, railroad Retail dealer, department store Stenographer, shorthand, typing
C	D	C	C	D	C	Clerk in art store Retail dealer, candy, confectionery Retail dealer, florist

The authors claim that three uses can be made of the occupational rating scales: to supplement other teaching methods in counselor training classes; to assist students, in courses about occupations; to learn facts that are significant in making wise occupational choices;

and to aid personnel workers in counseling individual cases regarding their most appropriate occupational selections. They warn against the mechanical use of the scales by those who are inadequately trained for scientific vocational counseling.

Perhaps the additional criticism should be given that the scales analyze occupations on the basis of some abilities that are unimportant (music and art) in most occupations and omit other abilities that are important (personality and sensory acuity) in most occupations. This is due in part to the ease and accuracy of measuring music and art and the difficulty of measuring personality. However, sensory acuity is easily measured and social intelligence is very difficult to measure.

The authors warn, and rightly so, that "use (of the scales) assumes an understanding of the theory of aptitudes, current thinking and counseling practices in regard to special and general abilities, backgrounds in measurement and techniques, job description and job analysis work, and the professional vocabulary of the educational personnel worker." In other words, the Minnesota Occupational Rating Scales should be used only by those who are well trained in the scientific techniques of vocational counseling, although in that case, the scales are almost useless. A well-trained counselor becomes so familiar with the human requirements of the various occupations that he does not need to refer to a scale of "pooled judgments of vocational psychologists." A part of his training is a wide knowledge of vocational requirements. However, the value of these scales in training future vocational counselors, as well as in teaching a counselee, is not overemphasized by the authors.

A "counseling profile set of disks" is devised to accompany the Occupational Rating Scales. They are colorful, suggest the accuracy of the circular slide rule, and thus are impressive to the naïve client. Perhaps they also suggest a professional dignity to vocational counseling, but as a tool for the trained counselor, they are worthless.

THE GOVERNMENT PROGRAM OF OCCUPATIONAL RESEARCH

The Wagner-Peyser Act (passed by Congress in 1933) created a national Employment Service that provided for the registration of workmen according to their occupational characteristics. (Twelve-and-a-half million workmen were registered during the first year.) It soon became obvious that an enormous amount of research would be necessary to create proper tools and methods for employment service. In 1934 the Secretary of Labor appointed a Technical Board to guide the research program of the Employment Service. This research

progressed along two lines—collection of occupational information and development of techniques of selecting workmen. The job information research was broken down into three phases—a definition of jobs (*Dictionary of Occupational Titles*), a classification of jobs at various levels of combination according to their human requirements (the *Occupational Code*), and detailed information about the essential content of each occupation (*Job Descriptions*). The selection technique research was broken down into two phases—the measurement of work proficiency (*Trade Question*, and *Work-sample Tests*), and tests to measure aptitudes or capacities to learn (*Potentiality Predictors*). These two phases of research were integrated (really a third phase) in the attempt to discover what jobs are sufficiently alike (*Job Equivalents*) to permit the transfer of workmen from one job to another without too great a handicap.

The results of research in selection techniques have not been published for general circulation. They are available for use only in the 1,600 offices of the United States Employment Service. Obviously, the general dissemination of information of this type would soon render it useless for the purpose for which it was intended. However, it is known that wide use was made of commercial tests as well as of new tests that were developed. Perhaps the major contribution of research in selection techniques was the development of appropriate norms for each occupation for which a test was used. General population norms are of little value when applicants are being selected for a highly specialized job. The U.S.E.S. has developed norm tables for various tests on a large number of occupations.

The research in job information is available to the public in a number of outstanding publications, which will be described in the following pages.

The Dictionary of Occupational Titles.—The original research work of the U.S.E.S. in the field of occupational information was an exhaustive analysis of certain occupations and the publication of detailed job descriptions (such as a five-volume study of the construction industry and a three-volume study of the retail trade). However, it soon became evident that a more immediate need was for a condensed description of jobs in all occupations and in all parts of the country—a job dictionary. This project was begun in 1936. Then it became evident that a revised classification of jobs was fundamental. Consequently, a new system of job coding developed concurrently with the definitions of some 17,452 jobs (known by some 29,744 different titles) from some 54,189 separate job analyses. The Dictionary of Occupational Titles was published in 1939. It defined at least 75 per cent of

all the jobs in the United States, in which are employed at least 90 per cent of all workers. "The job definitions in the Dictionary are short statements of the work performed in the various jobs found to exist in those industries and types of work listed and defined." There are six sections of the book: (1) a description and explanation of the definitions and titles and of the code system; (2) directions for using the book; (3) the book proper, jobs and their definitions; (4) a glossary of technical terms used in the dictionary; (5) a list of commodities sold in retail and wholesale with the job titles of their vendors; and (6) definitions of all industries and lists of jobs found in each. Needless to say, all definitions were verified by referring them to trade associations, labor unions, and other authorities.

An analysis of all these 17,482 jobs indicated that there were only about 7,000 occupations, or "groups of jobs sufficiently similar in respect to their duties, responsibilities and working conditions to warrant like treatment in personnel processes." Each of these separate job classifications (occupations) was given an identifying code number. Each code number consists of three parts—a single digit followed by a dash, two digits followed by a decimal point, and then two or three additional digits. For example, a matcher operator in the woodworking industry is identified by the following code number, 6-33.463. This occupation includes such closely related jobs as matcher man; matcher-machine operator; side-matcher man; tongue-and-groove machine operator.

Each of the three parts of a code number indicates a major occupational group. The first digit indicates the following major classifications:

- 0—Professional and managerial occupations
- 1—Clerical and sales occupations
- 2—Service occupations
- 3—Agricultural, fishery, forestry, and kindred occupations
- 4 and 5—Skilled occupations
- 6 and 7—Semiskilled occupations
- 8 and 9—Unskilled occupations

The second part of the code number (those digits between the dash and the decimal) indicates major subdivisions of the above groups. Some of these (there are over 500) are as follows:

Professional and Managerial Occupations

- | | |
|-----------------|-------------------------------------|
| 0-0 through 0-3 | Professional occupations |
| 0-4 through 0-6 | Semiprofessional occupations |
| 0-7 through 0-9 | Managerial and official occupations |

Clerical and Sales Occupations

1-0 through 1-4	Clerical and kindred occupations
1-5 through 1-9	Sales and kindred occupations

Service Occupations

2-0 through 2-09	Domestic service occupations
2-2 through 2-5	Personal service occupations
2-6	Protective service occupations
2-8 through 2-9	Building service workers and porters

Agriculture, Fishery, Forestry, and Kindred Occupations

3-0 through 3-4	Agricultural, horticultural and kindred occupations
3-8	Fishery occupations
3-9	Forestry (except logging) and hunting and trapping occupations

Skilled Occupations

4-0 through 5-18	Occupations in manufacturing activities
5-2 through 5-61	Occupations in nonmanufacturing activities
5-63 through 5-89	Occupations in miscellaneous activities
5-91 through 5-99	Foremen

Semiskilled Occupations

6-0 through 7-18	Occupations in manufacturing activities
7-20 through 7-61	Occupations in nonmanufacturing activities
7-63 through 7-89	Occupations in miscellaneous activities
7-93 through 7-99	Apprentices

Unskilled Occupations

8-0 through 9-18	Occupations in manufacturing activities
9-20 through 9-61	Occupations in nonmanufacturing activities
9-63 through 9-89	Miscellaneous

The significance of each step in a specific code number is illustrated as follows:

2-	Service occupations
2-2	Personal service occupations
2-26	Cooks, except private family
2-26.0	Chefs and cooks, large hotels and restaurants
2-26.01	Executive chef

It should be noted that the Dictionary of Occupational Titles is still in the process of becoming. During the first year after its release some 1,400 new definitions and 800 new code numbers were added.

It is expected that new editions of the dictionary will be published as the need arises and conditions permit.

The value of the Dictionary of Occupational Titles in vocational counseling cannot be overemphasized. No counselor, regardless of his breadth of experience and scope of training, can be familiar with 17,000 jobs and 7,000 occupations. Whether the counselor is in the personnel department of an industry or on the staff of an educational institution, the Dictionary of Occupational Titles is an indispensable handbook. It gives him a vertical view of more than 17,000 jobs and a horizontal view of jobs of the same general level. By interpreting the code numbers and reading the definitions, a counselor can get a working understanding of a job with which he is completely unfamiliar. Certainly the use of this dictionary should be the first step in the study of any job.

Job Descriptions.—The first industry to be thoroughly analyzed by the U.S.E.S. was the laundry industry. This was soon followed by the cotton textile industry and later by automobile manufacturing and construction industries. By March, 1942, fourteen industries had been analyzed and all jobs therein carefully described. These industries employ approximately 45 per cent of all wage earners and salaried workers in the country. More than 65,000 copies of these job descriptions have been distributed to libraries, schools, employment offices, industries, and the general public.

These job descriptions are vastly more detailed and complete than the job definitions in the Dictionary of Occupational Titles. Consequently, they are of more value in vocational counseling. They supply both the counselor and the counselee with a complete picture of each job in an industry—the work performed, the equipment used, the material which is processed, the physical conditions under which the job is performed, the dangers or safety hazards involved, the physical or mental effort required, etc. (See Chap. XIV for more complete discussion of job analysis and description.) Neither the vocational counselor nor the person whom he counsels need be “in the dark” about any job covered by these job descriptions.

In training courses for vocational counseling these job descriptions are second only to firsthand information about the various jobs in American life. It is best for a counselor to have worked at a job himself and know it firsthand; it is next best for him to know a great deal about a job, even if he gets the information out of a book. Students of vocational counseling should use both methods extensively. One should supplement the other. Job descriptions enable the counselor to become familiar not only about the details of jobs themselves, but

also about the human requirements of the job. A part of every description is a detailed analysis of the human traits and abilities that are important in job success.

Job Equivalents.—It is very important, both to the worker and to the industry in which he is employed, that each employee be capable of performing several jobs. If a worker is fitted to perform but one job and that job is abolished, he is no longer useful to that company. On the other hand, if he can perform several related jobs he is assured of steady employment and the company has the advantages of a steady workman. (The cost of labor turnover varies in different industries but ranges from \$30 to \$500 per man.)

As jobs were analyzed for the Dictionary of Occupational Titles and for Job Descriptions, records were also kept of the amount of some 47 human traits or worker characteristics estimated to be needed on jobs. These included such traits as strength, dexterity, perception of form, visual acuity, memory, adaptability, initiative, oral expression, etc. A worker-characteristic form was made out for each job analyzed. In 1937 the processing of these data began and jobs were classified into related groups or job families. By 1940 the worker-characteristic data for some 8,000 jobs had been analyzed and 49 job families had been discovered. Each job family consisted of a list of jobs requiring approximately the same human abilities. A workman who was successful on one of the jobs of a job family could with a minimum of effort and training perform any other job of the family with equal or nearly equal success.

The procedure used to determine how much of a worker characteristic is required by an occupation was the rating method. After analysts were carefully trained they simply judged whether a job required *A*, *B*, or *C* amount of each of the 47 characteristics. An *A* amount of a characteristic was a very great amount—that possessed by not more than 2 per cent of the general population. A *B* amount of a characteristic was also a superior amount but less than that indicated by *A*. It was more than that possessed by 70 per cent of the general population but less than that possessed by 2 per cent. A *C* amount of a characteristic was that possessed by the lowest 70 per cent of the population. Studies indicated that the reliability of the ratings was sufficiently high to justify the method.

It was found that job families were larger on those levels that require short or no training periods. Jobs with long training periods were not found in large job families. For example, there were a large number of jobs on the unskilled levels that required the same worker characteristics. On the other hand, there were relatively few jobs

on the professional levels that required the same worker characteristics. The range of job families, and the consequent range of transferability, may be illustrated by a pyramid of occupations arranged on levels as determined by the length of the training period (see Fig. 31).

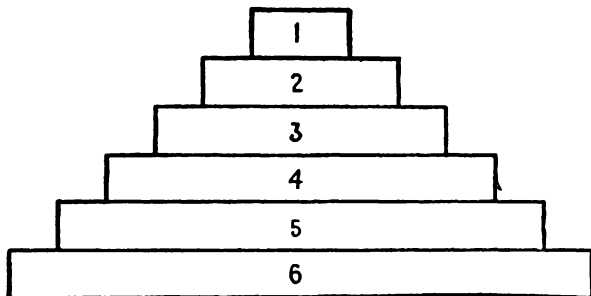


FIG. 31.—Relation of levels of training to size of job families. (1) Professional occupations, (2) semiprofessional and managerial occupations, (3) crafts and skilled occupations, (4) clerical occupations, (5) semiskilled occupations, (6) unskilled occupations.

Information about job families has a number of significant uses in vocational counseling. First, workmen can be transferred (for reasons of seasonality, shortage of material, war necessities, changes in consumer demands, etc.) to other jobs that are most like the jobs that they now perform. Consequently, there is a minimum of loss in additional training, waste of material, reduced production, etc. Second, new workmen can be placed in the appropriate job family even when it is impossible to place them on a specific job for which they have had training and experience. Third, workmen can be upgraded to jobs that are near the border line of a job family and just across the line from another job family that carries a higher pay rate. In short, information about job families enables a counselor to manage his manpower in a more intelligent manner.

Such information is also useful to the school counselor. Both he and the student can see a job in its functional relationship to other jobs. Opportunities and blind alleys are more clear. The worth of various human characteristics is more obvious. A job can better be evaluated when it is judged with other jobs in its job family.

Information about job families is released to the various offices of the U.S.E.S. as it becomes available. However, it is not restricted to information and may be obtained by others from the Department of Labor, Washington, D.C.

RELATING INDIVIDUAL ANALYSIS TO JOB ANALYSIS

It would seem that when the qualifications of an individual have been carefully evaluated and the requirements of various occupations

are known, the next step of getting the individual into the proper occupation would follow automatically. Actually the problem is not so simple. There are a number of difficulties. First, analyses of both the individual and the occupation are so inaccurate that conclusions can be drawn only with the utmost caution. Analyses furnish the individual with more information, but his vocational problem is yet to be solved. Second, there are always degrees of occupational success, and happiness is often as great at the lower levels as at the higher ones. An individual may be better qualified for a certain occupation but he may prefer more limited success in another field. Third, abilities are always dependent on effort and opportunity. Even a genius cannot succeed without trying and having an opportunity.

In practical vocational guidance there are a few key factors to be considered after the individual's abilities have been analyzed and occupations have been studied. They are practical considerations that may outweigh or supplement the data on individual and job profiles.

OCCUPATIONAL TRENDS

The 1940 census showed that there were 131,669,775 people in the United States. Some 52,840,762 of these were gainfully employed. More than 32,500,000 of these were employed in urban areas, 10,500,000 worked in the country, and the rest were employed in small towns and

TABLE 71.—PERCENTAGE OF POPULATION GAINFULLY EMPLOYED, 1870-1940

	Total	Male	Female
1870	32.5	54.7	9.7
1880	34.7	57.8	10.7
1890	37.2	60.2	13.1
1900	38.3	61.2	14.3
1910	40.6	63.2	16.7
1920	40.1	62.7	16.7
1930	39.8	61.3	16.7
1940	40.1		

villages. Approximately 20 per cent of all those gainfully employed were between the ages of fourteen and twenty-four. The trend of employment in the United States from 1870 to 1940 is shown in Table 71. Also, the increase in the employment of women is here shown. (Of course the picture since 1940, because of war conditions, has changed considerably.)

The trend in various fields of occupations is shown in Table 72. Some fields are increasing, some are decreasing, and some retain about the same relative status from one census to the next. Other things being equal, it is better to go into an occupation that is increasing rather than decreasing.

TABLE 72.—OCCUPATIONAL TRENDS, 1910-1940
(Per cent of total gainfully employed)

	1910	1920	1930	1940
Professional persons.....	4.4	5.0	6.1	6.5
Farmers (owners and tenants)...	16.5	15.5	12.4	10.1
Wholesale and retail dealers.....	3.3	3.4	3.7	3.9
Other proprietors, managers, and officials	3.2	3.4	3.8	3.7
Clerks and kindred workers.....	10.2	13.8	16.3	17.2
Skilled workers and foremen.....	11.7	13.5	12.9	11.7
Semiskilled workers.....	14.7	16.1	16.4	21.0
Unskilled workers.....	36.0	29.4	28.4	25.9

A careful study of the 1930 census in comparison with the 1940 census shows that some occupations are growing rapidly, some are decreasing rapidly, and others are more or less stationary. Selected occupations are shown in Table 73, for both men and women, with the percentage of increase or decrease.

So much for occupational trends as they have occurred in the past. Now, what of the future? Which occupational fields can be expected to increase and which ones will probably decrease? There are a number of fairly obvious trends that will probably carry into the future. First, the trend to develop machines to take care of more and more crude, unskilled work is probably only in its infancy. We will need fewer unskilled laborers and more trained mechanics and machine operators. Second, the trend toward more and more governmental function (in both service and regulation) will probably increase regardless of the political party in power. Most of these jobs are clerical in nature, but many of them are pioneering research and investigation. Third, the slowly developing trend toward the more efficient distribution of goods (through various forms of cooperative agencies) and the elimination of the parasitical and functionless middle-man will probably become more pronounced in the future. In fact, all occupations that are not essential in the cooperative life of our people will probably decline.

In Table 74 there are a number of occupations and occupational fields that may be expected to increase in the future and a number that

TABLE 73.—OCCUPATIONAL INCREASES AND DECREASES FOR MEN AND WOMEN AS INDICATED BY THE CENSUS FOR 1930 AND 1940
(Minus sign indicates decrease)

Occupation	Per cent	Occupation	Per cent
Men:		Men:	
Welfare workers	274	Dentists	0
Stenographers	92	Mailmen	0
Waiters	75	Typesetters	-12
Servants	67	Peddlers	-12
Military service	66	Miners	-12
Linemen, power	45	Motormen	-12
Canvassers, solicitors	41	Rollers	-15
Newsboys	37	Insurance agents	-16
Mechanics	36	Music teachers	-17
Janitors	26	Cooks	-17
Teachers	27	Messengers	-18
Printers	23	Barbers	-19
Chemists	21	Chauffeurs	-20
Elevator operators	17	Painters	-20
Factory operatives	15	Machinists	-22
Clerks	14	Plumbers	-25
Apprentices	12	Molders	-27
Reporters, authors	11	Tailors	-28
Lawyers	11	Electricians	-29
Cabinet makers	10	Baggagemen	-32
Engineers, technical	9	Firemen, locomotive	-33
Bakers	9	Telegraph operators	-37
Firemen, city	8	Plasterers	-38
Physicians	8	Masons	-39
Clergymen	8	Carpenters	-39
Architects	8	Boilermakers	-43
Art teachers	5	Brakemen	-43
Sheet metal workers	1	Laundrymen	-43
Bookkeepers, accountants	1	Sailors	-45
Draftsmen	1	Real estate agents	-50
		Conductors	-53
		Blacksmiths	-57
Women:		Women:	
Welfare workers	84	Clerks	-2
Beauticians	79	Janitors	-4
Servants	71	Bookkeepers, accountants	-11
Canvassers, solicitors	63	Teachers	-14
Office machine operators	51	Insurance agents	-17
Waiters	51	Dressmakers	-19
Saleswomen	25	Art teachers	-22
Stenographers	23	Telephone operators	-24
Librarians	18	Music teachers	-30
Nurses	16	Practical nurses	-43
Physicians	10	Telegraph operators	-54
Reporters	8	Laundry workers	-72
Factory operatives	5	Cooks	-73
Elevator operators	2	Actresses	-80

may be expected to decrease. These predictions are based on obvious trends in the 1940 census, developments since 1940, and the predictions of specialists in occupational development.

TABLE 74.—PROBABLE OCCUPATIONAL TRENDS IN THE FUTURE

Increase	Decrease
Scientific farming	Unskilled labor
Industrial chemistry	Sales (other than across counter)
Aviation	Domestic service
Engineering (all kinds)	Subsistence farming
Electrical	Lumbering
Mechanical	Animal husbandry
Chemical	Railroading
Agricultural	
Lighting and heating	
The professions of	
Medicine	
Nursing	
Teaching	
Personnel management	
Mechanical repair and operation	
Clerical jobs (all kinds)	
Governmental work	
Welfare work	

INTELLIGENCE IN OCCUPATIONS

The most fundamental aptitude to be considered in vocational guidance is mental activity. There are two reasons for this: first, occupations vary in the amount of intelligence they require, and second, individuals vary in the amount of intelligence they possess. Because there is a scarcity of intelligence on the higher levels it is important for every man to be engaged in an occupation that just fits his intellectual level. The intellectual hierarchy of occupations was long assumed but definitely proved by the Army Alpha Test of the First World War. The average scores made by soldiers who, as civilians, had been engaged in the various occupations are shown in Table 75. This does not indicate how much intelligence is required in an occupation but only how much those who are in various occupations actually possess.¹

Hartson² reports a study of the relation of intelligence to the occupational choice of some 1,100 graduates of a small college. The average centile rank of each occupational group on an intelligence test taken while in college is shown in Table 76. This merely indicates which occupations appeal to the various intellectual levels.

However, the vocational counselor is not so much concerned with the average intelligence of those who are now in the various occupations

¹ *Nat. Acad. Sci. Memoirs*, Vol. 15, 1921.

² Hartson, L. D., *Intelligence and Scholarship of Occupational Groups*, *Person. J.*, 1928, 7, 281-285.

as he is with the level of intelligence necessary for success in the various occupations. As suggested earlier in this chapter, the Minnesota Occupational Rating Scales indicate the intelligence level necessary for success in some 430 occupations. The Barr Scale of Occupational

TABLE 75.—SCORES MADE ON THE ARMY ALPHA BY VARIOUS OCCUPATIONAL GROUPS

Occupation	Average	Occupation	Average
Engineer officer.....	162	Telephone lineman.....	64
Medical officer.....	129	General carpenter.....	60
Civil engineer.....	117	Baker.....	59
Accountant.....	117	Bricklayer.....	58
Mechanical draftsman.....	114	Truck driver.....	58
Mechanical engineer.....	110	Barber.....	55
Bookkeeper.....	101	Boiler maker.....	51
General clerk.....	96	Teamster.....	50
Railroad clerk.....	91	Miner.....	49
Telegrapher.....	85	Farmer.....	48
Auto assembler.....	68	Laborer.....	47

TABLE 76.—INTELLIGENCE AND OCCUPATIONAL CHOICE OF COLLEGE GRADUATES

Occupation	Intelligence centile	Occupation	Intelligence centile
College teaching (women).....	77	Business (men).....	50
College teaching (men).....	65	Engineering.....	49
Secretarial work.....	59	Business (women).....	49
Journalism.....	57	Library work.....	46
High school teaching (men).....	57	Salesmanship.....	44
Medicine.....	54	Social work.....	41
High-school teaching (women).....	53	Y.M.C.A. and Y.W.C.A....	39
Religious work.....	51	Physical education (women) ..	35
Law.....	51	Art.....	27
Music.....	51	Physical education (men).....	20

Status is another attempt to arrange occupations into an intellectual hierarchy. This was also constructed by pooling the judgments of 20 experts concerning the minimum intellectual requirements of 121 occupations. Sample occupations and P.E. values are shown in Table 77. Terman¹ used this scale in his study of the fathers of

¹ Terman, L. M., et al., *Genetic Studies of Genius*, Vol. I, Stanford University Press, Stanford University, California, 1925.

gifted children and found that their mean score was 12.77 as compared with 7.92 for the general population.

TABLE 77.—EXTRACTS FROM THE BARR SCALE OF OCCUPATIONAL STATUS

3.38	Circus roustabout..	Does heavy, rough work about a circus
6.42	Switchman.....	Tending switch in railroad yards
7.54	Policeman.....	Average patrolman
10.11	Telegraph operator.	In small town
12.02	Librarian.....	In small institution or public library
15.14	High-school teacher.	College or normal graduate. Not the most progressive
16.59	Consulting engineer.	In charge of corps of engineers
17.81	University professor	Has A.M. or Ph.D., writes, teaches, and does research
19.45	Research leader..	Like Binet or Pasteur

TABLE 78.—BARR SCALE AND FRYER SCALE VALUES FOR MAJOR OCCUPATIONAL GROUPS OF THE DICTIONARY OF OCCUPATIONAL TITLES

Occupational groups	D.O.T. codes	Mean Barr value	Mean Fryer value	Lorge-Blau value
Professional.....	0-0 through 0-3	14.62	6.05	10
Managerial and official	0-7 through 0-9	13.75	5.5	9
Semiprofessional..	0-4 through 0-6	11.58	5.68	8
Clerical and kindred..	1-0 through 1-4	10.13	5.38	7
Sales and kindred....	1-5 through 1-9	10.45	4.76	6½
Protective service...	2-6	8.58	5.17	6
Skilled	4- and 5-	8.54	4.9	5½
Agricultural.....	3-0 through 3-4	7.62	4.9	5
Personal service.....	2-2 through 2-5	8.03	4.64	4½
Semiskilled.....	6- and 7-	6.67	4.72	4
Unskilled	8- and 9-	3.93	3.73	3
Domestic service.....	2-0	1.54	4 0	2
Fishery	3-8	.. ..	3.68	1

Fryer¹ studied the intelligence test data from the First World War (see Table 75) and attempted to modify it to fit occupational requirements. His list is similar to the Barr list but arranged in groups of occupations having essentially the same intellectual requirements. The professions are in the *A* group and the common-labor jobs in the *C* and *D* groups.

Lorge and Blau² used both the Barr and Fryer scales to estimate the intellectual demands of the major occupational groups in the Dictionary of Occupational Titles. They first classified all the occupations listed in both scales into the major groups as listed in the dic-

¹ Fryer, D., *Occupational Intelligence Standards, Sch. & Soc.*, 1922, 16, 273-278.

² Lorge, I., and Blau, R. D., *Broad Occupational Groupings by Estimated Abilities, Occupations*, 1942, 21, 288-295.

tionary. They then computed the mean scale value for each group. These values are shown in Table 78. On the basis of this they recommended that the dictionary groups be given values, as indicated in the last column in Table 78.

However, if the mean Barr values and the mean Fryer values are added for each group, a relationship is indicated that does not quite conform to the Lorge-Blau recommendations (see Table 79). If these sums are taken as a basis for comparing the intellectual demands of each group, an approximate estimate can be made of the mean mental age and I.Q. for each group. This is indicated in Table 79.

TABLE 79.—SUM OF BARR AND FRYER SCALE VALUES AND INTERPRETATION IN APPROXIMATE INTELLIGENCE MEANINGS

Occupational groups	Sum of Barr and Fryer values	Approx. M.A.	Approx. I.Q.
Professional.....	20 67	18 up	120 up
Managerial and official ..	19 25	17	113
Semiprofessional....	17.26	16	107
Clerical and kindred ..	15 51	15	100
Sales and kindred ..	15.21	15	100
Protective service ..	13.75	14	93
Skilled.....	13.34	14	93
Personal service....	12.67	13.5	90
Agricultural.....	12.52	13.5	90
Semiskilled.....	11.39	13	87
Unskilled.....	7.66	11	73
Domestic service.	5.54	10	67
Fishery.....	..	9.5	63

It should be noted that a level of intelligence higher than that required by the occupation is also a handicap. The work soon becomes monotonous and the individual either quits the job because of lack of interest or he becomes negligent and is fired. Too superior intelli-

TABLE 80.—INTELLIGENCE AND LENGTH OF SERVICE
Average Days'

Test Score	Service
30-39	156
40-49	142
50-59	107
60-69	100
70-79	96
80-89	87
90 up	35

gence is the cause of high labor turnover. Years ago Viteles¹ found that the amount of intelligence may be inversely related to length of service on certain jobs. His data are shown in Table 80.

THE WORTH OF VOCATIONAL GUIDANCE

So far in this chapter the data seem to indicate that a lot is known about how to fit men to jobs. Apparently it is possible to analyze human qualifications and job requirements with a fair degree of scientific accuracy. It would seem that vocational guidance could be done with justifiable success. Let us now examine the record.

Webster² made a follow-up study of a group of advisees from 2 to 5 years after they had been given a battery of tests and vocationally advised. He found that 52.8 per cent of them had followed recommendations, 29 per cent had ignored recommendations, and 18.2 per cent could not be classified in this respect. For those who followed recommendations, the ratio of vocational success to vocational failure was 28 to 1; for those who did not follow recommendations, this ratio was but 1 to 1.

A study of 639 vocational advisees of the National Institute of Industrial Psychology in England revealed that the ratio of success to failure was 15 to 1 for those who had followed recommendations and but 2 to 1 for those who had not. Of those who completed their formal schooling and followed recommendations, 79 per cent were considered to be vocationally well adjusted.³

Perhaps the most complete study of this nature was made by Thorndike.⁴ Eight years after 1,807 New York school children (ages thirteen to fifteen) had been given intelligence, clerical, and mechanical tests, they were interviewed concerning the kind of work they were doing, their annual wages, their interest in their work, and the frequency of job changes. In general, the correlations were all extremely low. The author concludes that "no combination of the facts gathered by us at the age 14 would have enabled a vocational counselor to foretell how well a boy or girl would do in mechanical work six to eight years later, or how happy he would be at it." Critics have suggested that if these young people had been vocationally counseled as

¹ Viteles, M. S., Selecting Cashiers and Predicting Length of Service, *J. Person. Res.*, 1924, 2, 267-273.

² Webster, E. G., A Follow-up of Vocational Guidance, *J. Appl. Psychol.*, 1942, 26, 285-295.

³ Report on A Follow-up of Vocationally Advised Cases, *Hum. Factor*, Lond., 1937, 11, 16-26.

⁴ Thorndike, E. L., et al., *Prediction of Vocational Success*, Oxford University Press, New York, 1934.

well as merely tested, the correlations would have been much higher. Then, the original testing for the study was done in 1921 when vocational tests were less adequate than they have become in more recent years. However, it is worth noting that, while low, the correlations in this study were positive. They indicated some relationships. The test data were not entirely insignificant. A well-trained vocational counselor could have used these data to supplement other data about these young people, and the picture for making an inevitable vocational choice would have been more clear. Test data are not infallible but they help.

The point cannot be overemphasized that test data in the field of psychology are yet crude and must be used with intelligent caution by those who are properly trained for their interpretation. Vocational guidance counselors must be more than teachers who are merely interested in young people and their problems. They must be professionally trained psychologists who are willing to limit their work to this special field. Vocational guidance is a profession that must be as carefully and thoroughly prepared for as medicine or law or engineering.

The future of vocational guidance would seem to be especially alluring. Monumental steps have been made in the last 5 years in developing scientific techniques in individual and occupational analysis. The experience of the analysis and placement of 10,000,000 soldiers will soon be made available to us. New tools already exist for more accurately solving the problem of a boy's or girl's vocational choice. The need is for those who are adequately trained in using these new devices.

SUMMARY

Vocational guidance consists of two steps—analyzing the individual and analyzing the occupation. Both are technical procedures that require the services of those who are professionally trained. However, even with all the technical data possible and the clarity of its interpretation, the human element is still involved and the individual concerned makes the final decision. All the vocational specialist can do is counsel. He must sell his conclusions to the counselees.

This suggests that in addition to being a specialist in analyzing the qualifications of individuals and the requirements of occupations the counselor must also be a teacher. The individual whose vocational problem is being solved must learn why one occupation is more appropriate than another. He must understand his qualifications and their significance in the occupational world. He must be taught to become a specialist concerning his own problem.

RECOMMENDED SUPPLEMENTARY READINGS

- BINGHAM, G. V.: *Aptitudes and Aptitude Testing*, Harper & Brothers, New York, 1937.
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Ackerson¹ made a statistical study of the 5,000 children examined at the Illinois Institute for Juvenile Research. He found that adjustment problems were more frequent among boys than among girls and that frequencies increased for both up to about the age of twelve years. He divided adjustment problems into (1) personality prob-

TABLE 81.—COMPARATIVE FREQUENCIES OF CERTAIN BEHAVIOR PROBLEMS

Personality problems	Per cent	Conduct problems	Per cent
Mental conflict.....	4	Stealing.....	26
Hyperactive (restless).....	23	Lying.....	24
Inferiority feelings.....	6	Truancy (from school).....	19
Daydreaming.....	7	Disobedience.....	17
Egocentric.....	11	Truancy (from home).....	18
Seclusive.....	10	Fighting.....	10

lems and (2) conduct problems. The frequencies of these two types of adjustment problems are shown in Table 81. However, other investigators have found greater frequencies of mental conflicts and inferiority feelings. Paynter and Blanchard² found 45 per cent of a group of Los Angeles children with mental conflicts and 54 per cent of a group of Philadelphia children with inferiority feelings.

TABLE 82.—COMPARATIVE FREQUENCIES OF BEHAVIOR PROBLEMS IN BOYS AND GIRLS
(In per cent)

Problems	Boys (N 2,853)	Girls (N 1,739)
1. Nervous, restless, overactive, irritable, high strung, impatient, excitable.	44	39
2. Disobedient, incorrigible, stubborn, contrary, defiant	42	37
3. Temper display, emotional, temperamental.	34	27
4. Dull, slow, listless, lack of initiative.	30	28
5. Fighting, quarrelsome.....	28	20
6. Sensitive, worries.....	19	18
7. Egocentric, selfish.....	17	15
8. Lacks interest, inattentive.....	18	11
9. Swears, profane, obscene language.....	11	6
10. Depressed, unhappy.....	9	6

¹ Ackerson, L., *Children's Behavior Problems*, University of Chicago Press, Chicago, Illinois, 1931.

² Paynter, R. H., and Blanchard, P., *A Study of Educational Achievement of Problem Children*, Commonwealth Fund, New York, 1929.

The 10 most frequent adjustment problems found by Ackerson are shown in Table 82. While the frequencies are relatively the same for both boys and girls, note that the boys exceed the girls in all 10 classifications of adjustment problems. This is also shown in Figs. 32

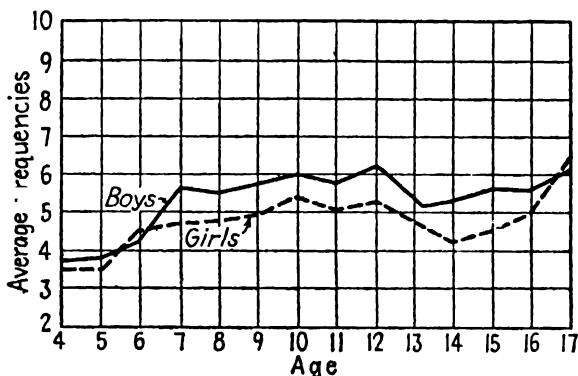


FIG. 32.—Frequencies of personality problems at various ages (2,776 boys; 1,675 girls).

and 33, except for age seventeen. Here the girls exceed the boys in both personality problems and conduct problems. The reason is, perhaps, that they are physiologically and socially older than boys at this chronological age.

However, adjustment habits are usually not either good or bad, effective or ineffective, even in the same individual. More often they

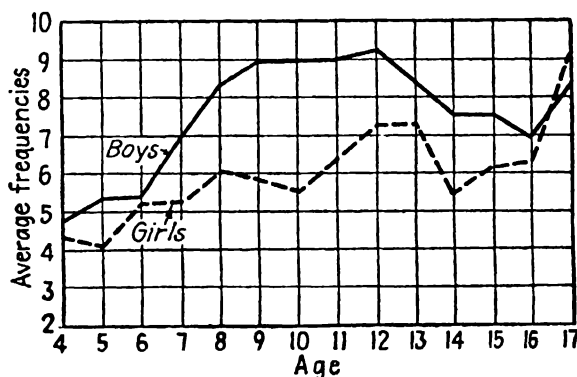


FIG. 33.—Frequencies of conduct problems at various ages (2,776 boys; 1,675 girls).

are somewhere between these two extremes. Some are effective and result in adjustment; some are partly effective and result in limited adjustment; some are neutral, neither effective nor ineffective; and some are actually harmful and increase the maladjustment. It is important to know the classification to which each adjustment habit

ineffective adjustments may also be due to ineffective adjustment habits. Better methods of adjustment are possible but have not been learned. In such case, there is no excuse for partial adjustments. There is need for personality reformation. Ineffective habits should be eliminated and more effective ones learned in their stead. The first step is to be able to recognize habits that afford but limited adjustment.

HABITS OF SUBSTITUTION

When the satisfaction of a want is thwarted by a difficulty of considerable magnitude, partial relief of the resulting tensions may be accomplished by indirect substitute satisfaction. Direct adjustment is not made but some other adjustment is substituted that affords partial satisfaction. It is better than nothing but not as good as a direct adjustment to the specific want.

Daydreaming.—Daydreams may be good, or they may be bad. When they are the forerunners of future action, they are good; when they are substitutes for future action, they are bad. Daydreams can be plans, predictions, blueprints. They can be ideals for guiding the most complete and satisfying adjustments. But they can also be ends in themselves. They can be substitutes for adjustments.

The daydreamer is often one who has found that desired adjustments are too costly in effort. He feels that the satisfaction of adjustment is not worth the cost of its accomplishment. So he retreats from the outside world of reality with its difficult adjustments into the world of his own imagination. Here difficulties are easily eliminated and successful adjustments are achieved without effort. Of course he knows that his dreams are not real but he enjoys them anyhow. They partly relieve the tensions of his unsatisfied wants, and they do him no harm. Daydreaming is an enjoyable pastime.

Identification.—It is sometimes pleasant to identify oneself with those who have made adjustments that we would like to make. For example, it is difficult to become an athlete, but it is not difficult to join an athletic club and associate with athletes; it is difficult to become wealthy, but it is not difficult to join a country club and associate with the wealthy; it is difficult to graduate from college, but it is not difficult to attend college functions and become quite "collegiate." There is some satisfaction in being identified with those who have satisfied the wants we would like to satisfy if we were not thwarted in doing so.

Identification begins early in the life of the child. He is small, weak, and unimportant, so he identifies himself with his father. He

reacts to any criticism of his father as a personal affront. Also, he enjoys the reflected glory of his father's achievements. Likewise, he identifies himself with his dog and enjoys as a personal adjustment any credit or admiration that goes to the dog. Some boys identify themselves with inanimate objects such as airplanes, locomotives, automobiles. The power and beauty of these objects give the boy who owns them (a form of identification) a feeling of satisfaction, even if they are but pictures pasted on the walls of his room. Any criticism of his objects of ownership is taken as personal. He has formed a habit of identification.

Identification is better than nothing if direct adjustment is impossible, but it should not become a habit that interferes with more complete adjustment. A boy gets limited satisfaction from shaking hands with Babe Ruth, but he will get more satisfaction from becoming a big-league player himself. Identification is at best but a substitute for the real thing.

Overemphasis.—A little man would like to be influential with his fellows, but he is so short that they seldom notice him; so he develops a loud voice. This tends to detract attention from his size to his voice. An unattractive woman would like to be attractive, but her physical charms are below average; so she develops a habit of wearing spectacularly attractive clothing. This tends to detract attention from her physical limitations to her clothing superiorities. A boy would like to be appreciated by his teacher and his fellow pupils, but he has a low I.Q. and no other traits of superiority; so he joins a back-alley gang. These fellows treat him as an equal, and, after the first raid on a fruit stand, they admire his bravery. They pay no attention to his inferiority in schoolwork.

Well-adjusted people do not overemphasize anything. They do not need to. They are not trying to cover up anything and they do not feel the need for undue attention. Overemphasis of a trait or adjustment is usually to detract attention from some other trait or adjustment regarding which the individual feels inferior.

Miss A was a fourth-grade teacher who was very critical and unfair in her treatment of a little illegitimate colored boy in her room. It was later learned that Miss A herself had an illegitimate child who was being reared by a married sister.

Delinquency.—It is characteristic of all individuals, regardless of age, to desire the approval of others. Human beings want other human beings to think well of them. (This is a derived want.) Every child wants to secure and maintain desirable social status. If he does

not attain it, he seeks for some substitute satisfaction (*i.e.*, he compensates).

Children who do inferior school work, and thus lose social status, may compensate for it by exhibiting superior bravery in acts of delinquency. Students of delinquency have found that the factor that correlates most highly with delinquency among school children is low grades. This does not prove that low grades cause delinquency but only that they are both factors in the same situation. However, the implication is that if the child could have his want for social approval satisfied in the school, he would not seek for it elsewhere. Children who are socially accepted in school do not need to seek for social acceptance with the delinquent gang (see Chap. XI for discussion of delinquency).

Sublimation.—When conditions beyond control make the satisfaction of wants impossible, partial satisfaction can be attained by changing the want to one that is closely related but more “sublime.” As Wallin¹ explains, “Sublimation in its general connotation refers to the indirect expression of primitive urges in ethically and socially acceptable and useful behavior patterns.” Everyday life is full of illustrations of sublimation. The good teacher is often the motherly type who was never asked to marry and now sublimates her wants by mothering other people’s children. The boy who manages school traffic so well was the school bully in the lower grades. His want to control others is now sublimated into a useful channel. The local druggist really intended to be a physician but his school grades were too low to enable him to get into medical school so he has compromised on a related but what is to him a sublime occupation. Sublimation is a socially approved alternate when the real want cannot be satisfied.

HABITS OF RATIONALIZATION

Rationalization is a term in psychology that suggests a desirable type of behavior. One would suppose that it is derived from “rational,” meaning to reason. It is not. It means self-deception. It is a process of fallacious thinking intended to justify an adjustment that is emotionally desirable but not intellectually justified (and often socially disapproved as well). It is a procedure of fooling one self into believing something that was originally recognized as false. An inferior adjustment with emotional appeal is always defended against a superior adjustment with intellectual appeal.

¹ Wallin, J. E. W., *Personality Maladjustments and Mental Hygiene*, p. 431, McGraw-Hill Book Company, Inc., New York, 1935.

Projection.—A common form of rationalization is to project the blame for the consequences of one's own behavior to something else, or to someone else. A poor golfer fools himself into believing that the fault is not with himself but with his clubs, or with the course, or with the ball, or even with the caddy. Projection is a misplacement of blame. The woman who has made an unsatisfactory marriage is likely to condemn her husband, or his family, or her children, or the neighborhood, or the marriage institution itself. She fools herself into believing that circumstances beyond her control were responsible for the failure of her marriage. She projects the cause of her failure from herself to someone else.

Projection may also take the form of excusing some fault, or socially disapproved motive, by pretending to see it in others. The woman who is unattractive is likely to see the same fault in many other women. The boy who is intellectually inferior takes pride in pointing out the inferiority of others. The man who is secretly dishonest is likely to suspect that everyone else is also dishonest. It is easy to project one's own faults into others. In fact, when one is oversensitive to the presence of some fault in others, the chances are that he also possesses the same fault.

Sour Grapes.—The fox reasoned that the grapes that were too high to get were too sour anyhow. They were unattainable and *therefore* undesirable. Many people engage in the same sort of rationalizing. A man whose party was defeated in the 1944 election expressed the opinion that the winning party was most unfortunate. The war and all its attending problems, he said, made office holding at this time extremely undesirable. He even opinionated that the losing party in some cases had deliberately chosen weak candidates so as to be sure to lose the election. A rival who loses a girl's affections to a competitor can see all sorts of faults in her. He tries to fool himself into believing that he is really the lucky man.

James C. was recently refused admission to a certain medical school and was accepted by one of definitely inferior standing. He elaborately explained to the writer why he had "chosen" the latter. He was really trying to make himself believe that the good school that he could not attend was inferior to the poor school that he could attend.

HABITS OF EVASION

Another method of partial adjustment is to avoid or to evade the scene of a difficulty. Problems that can be avoided do not need to be solved. A difficult school adjustment can be partly accomplished

by being absent from school on the day when the adjustment must be made. The problem of fitting into a disagreeable employment situation can be partly solved by getting another job. All the difficulties of securing a college education can be side-stepped by not going to college. Sometimes such avoidance is justified but there is danger of forming a habit of avoidance and then using it when a more complete adjustment could be made. When people habitually avoid problems, they become timid and seclusive. To avoid problems, they become unsocial, selfish, individualistic, and suspicious. They withdraw more and more and live within a shell of personal interests.

TABLE 84.—RANKINGS OF TEACHERS AND MENTAL HYGIENISTS ON SERIOUSNESS OF FIFTY BEHAVIOR TRAITS

Behavior traits	Mental hygienists' rankings	Teachers' rankings
Unsocialness	1	40
Suspiciousness	2	37
Unhappy, depressed	3	22
Resentful	4	29
Fearfulness	5	36
Cruelty, bullying	6	8
Easily discouraged	7	23
Suggestible	8	28
Overcritical of others	9	45
Sensitiveness	10	48
Domineering	11	33
Sullenness	12	35
Stealing	13	2
Shyness	14	50
Physical coward	15	31

The habit of avoiding adjustment problems is more serious in mental health than is usually apparent. Children who avoid problems are seldom as much of a nuisance around adults as those who face adjustments and struggle with them. Consequently, avoidance habits usually become well formed before they are recognized as such. In fact, teachers do not usually recognize those behavior traits associated with avoidance as undesirable. Wickman¹ asked 13 groups of elementary-school teachers (500 in all) and 30 mental hygienists from child guidance clinics to rank a list of 50 behavior problems, common among children, as to seriousness. "Whereas the teachers considered

¹ Wickman, E. K., *Teachers and Behavior Problems*, The Commonwealth Fund, New York, 1938.

shyness, sensitiveness, unsocialness, fearfulness, dreaminess, among the least serious of all problems, the mental hygienists ranked them, together with unhappiness, depression, easy discouragement, resentfulness, cowardliness, suggestibility, and overcriticalness, at the very top of the list as the most serious problems." This is indicated in Table 84.

While evading adjustment is usually accomplished by withdrawal and introverted habits, it may be attained by what Wickman calls "active attack." A problem may be evaded by defiantly attacking the difficulty. Instead of the individual adjusting to the difficulty, the difficulty is forced to adjust to the individual. For example, a boy may avoid learning a school assignment by militantly denouncing it. If it is then changed to fit him, the evasion is successful. Of course, if he fails to change the difficulty, he is in a greater state of maladjustment than ever. His behavior has not afforded even partial adjustment.

HABITS THAT PRODUCE NO ADJUSTMENT

Those people who have formed habits that produce complete adjustment are in good mental health. They enjoy the satisfaction of accomplishment. Those who have formed habits that produce but partial adjustment are in corresponding states of tension. They are not in mental ill health, and yet the happiness of living is definitely limited. They are handicapped. Still other individuals form habits that result in no adjustment. Their problems are neither increased nor diminished. Their tensions are not reduced. In time they become maladjusted personalities.

The question arises: Why are completely useless adjustment habits ever formed? The answer depends somewhat on the type of habit, but in general, useless habits are carry-overs from childhood days. They indicate that an individual's personality has not kept pace with his years. An adult in age is not always an adult in conduct.

WORRY

If a person should accidentally step on a tack, or sit on a pin, or touch his hand against a hot stove, and then should remain in that position without moving except to talk about it to anyone who would listen, he would be worrying. Worry is a constant nonadjustive verbal reaction (either explicit or implicit or both) to an adjustment situation. It is a state of grumbling and enduring. Worrying is not a process of adjustment. It is not even planning for adjustment. It is an utterly useless waste of time.

Worry usually occurs only when a person does not know how to make a successful adjustment. Therefore, it is an indication of ignorance. People do not worry about problems concerning which they have adequate knowledge. They may make continuous solution attempts, but they do not worry. The worrier does not try to solve his problems; he just talks about the fact that they exist. He continues to be irritated by his problems, yet he makes no attempt to reduce the irritation.

The worrier is often emotionally unstable. His wants are beyond his capacity and then he is irritated because he cannot realize his ambitions. He becomes oversensitive. He worries about problems that should not concern him at all. He creates his own maladjustments.

Worry is perhaps the most common symptom of mental ill health. Hicks¹ surveyed a group of 600 school teachers from all geographical sections of the United States, to find the frequency of symptoms of nervous instability. He found that worry ranked first. "Worry, disturbed sleep, shyness, indecision, absent-mindedness, fatigue, and headache were problems of greatest number."

The remedy for worry is to become so occupied with wants that can be satisfied that there is no time to worry about wants that cannot be satisfied. Active, successful people do not worry. A successful mother does not need to worry about her children, and she is too busy to worry about not being elected president of the local chapter of the A.B.C. A successful farmer has no farm problems to cause worry, and he does not have time to worry about problems that do not concern him directly. Women without family responsibilities, or men without occupational obligations, who have not learned how to spend leisure time intelligently, become interested in problems that are beyond their intellectual and educational limitations. They do not know how to make the first steps toward solution. So they worry. Worry is often about events that have occurred in the past and cannot possibly be corrected. A woman worries because her husband has died; or a man worries because he has lost money in an investment. The remedy, as stated above, is to become so occupied with making useful adjustments that there is no time left to worry about events that are past. Only a child, either in age or intelligence, cries because he cannot reach the moon.

The importance of correcting the habit of worrying cannot be overemphasized. It always leads to something worse. Unfortunately, the mental capacity of the worrier is limited, and he usually

¹ Hicks, F. R., *The Mental Health of Teachers*, Peabody Contributions to Education, 1934.

needs help to correct his bad habit. The worrier should see a psychologist, a psychiatrist, or a mental hygienist of some sort, for assistance in substituting habits of adjusting to more sensible problems. Worry is senseless reaction to inappropriate problems.

NEGATIVISM

Children frequently develop patterns of anti-behavior. They refuse to do what they are told to do, just because they are told. They have formed habits of violating direction and advice regardless of the adjustive value of such behavior. This is called *negativism* and is a common characteristic of child behavior. It is a child's way of asserting his independence and protesting against adult control. It is a crude way of proving to himself that he is independent and able to get along without the help of others.

Studies show that negativism occurs most frequently in children at the age of three. Levy and Tulchin¹ found in a study of a thousand children that the maximum frequency (30 per cent of all children) of completely negativistic children was between thirty and forty months of age. This agrees with Ackerson's study (quoted above) except that he found that negativism increased again at age sixteen.

Negativistic behavior is not serious in the child, but it too frequently appears on the adult level. The adult who is negativistic is, like the child, rebelling against his own feeling of inferiority. He objects to the advice of others, not because it is bad advice, but because it implies that he is inferior to the one who gives the advice. In order to prove (to himself) that he is not inferior, he not only ignores the advice but acts in an opposite manner.

Such behavior is more popularly known as stubbornness. It is supposed to be a characteristic of some of the lower animals. The expressions, "stubborn as a mule," "bullheaded," "contrary as a hog," refer to this type of behavior. It is frequently emotional and seldom intelligent.

Negativism in the adult is not limited to opposition to the advice of other individuals. It may be directed against social customs. Social nonconformity is an example of such behavior. Even criminality may be an expression of negativism. Laws and customs are often violated, not to effect an adjustment, but to enable some immature person to prove to himself that he is important. Individuals who have such negativistic behavior patterns are jealous of any limitations of personal freedom. If a custom or a law forbids an act of behavior,

¹ Levy, D. M., and Tulchin, S. H. The Resistance of Infants and Children, *J. Exp. Psychol.*, 1923, 6, 304-322.

the negativistic person is not satisfied until he has performed the act. By prohibiting the use of intoxicants the Eighteenth Amendment caused many people who would never have tasted liquor to begin to patronize the bootlegger. Wartime price control was sabotaged by the black market, not because price regulation was wrong, but because there were so many negativistic people in our society.¹ In other words, laws and customs are often violated, not because they are wrong and inappropriate, but because those who violate them are trying to prove to themselves that they are not weak and unimportant but stronger than society itself.

Such behavior is not even partly satisfying. As a means of adjustment it is a complete failure. It does not relieve the tensions of a want, nor does it relieve the feelings of personal inferiority. Negativism is a childish way of reacting to adjustment difficulties.

The remedy for negativistic habits, similar to that for all inadequate attempts at adjustment, may be stated as follows:

1. Identify the negativistic habits.
2. Identify the wants and difficulties that bring about the negativistic reaction patterns.
3. Learn how to make complete adjustment to these wants by
 - a. Modifying the want to fit the limitations of the wanter.
 - b. Practicing the methods suggested above (trial and error, and scientific method) for producing complete adjustment, until they become habits.

It is not necessary to break negativistic habits after the more adjustive habits have been learned. They were formed for want of better adjustments and will naturally drop out when the better methods are learned. However, they will continue to function in those situations that are not adequately and promptly relieved by the newer habits.

REGRESSION

Successful adjustment is enjoyable. It is a pleasure to satisfy wants. Consequently, human beings attempt to enjoy such pleasure as often and as long as possible. Not to satisfy wants is annoying and produces organic tensions that are detrimental to health and happiness. It is natural to try to avoid such states as much as pos-

¹ Being defeated in a series of elections creates a feeling of inferiority in some people that is not unlike that of the child. "New deal" policies were violently opposed, not on their merits, but to demonstrate that anti-forces were still powerful. Such opposition is not constructive but destructive and negativistic.

sible. When the enjoyment of successful adjustment is more limited and more seldom than usual, there is a temptation either to recall former adjustments and live them over again in memory, or to use the adjustment procedures over again that were successful on former occasions, whether they are now appropriate or not. This is called *regression*. The individual returns to states of former adjustment and attempts to experience them over again in memory, or he actually uses the methods that he found to be successful on former occasions.

The old man who tells of the successful adjustments of his earlier years, or the woman who cries when her wants are thwarted, or the man who angrily strikes another who disagrees with him, or the boy who is homesick when he goes away to college, or the woman who pretends she is ill when her husband refuses to buy her a new dress—these are examples of regression.

Harold C. was a very successful college athlete. Because of this, his professors made college especially easy for him. After graduation he became a road construction contractor, work he knew but little about. He failed at this and lost most of the money he had borrowed to get started. He is now employed in a cheap pool hall and entertains everyone who will listen with stories of his college days. He ignores the present as much as possible because he is unadjusted. He lives over and over his college days because he was then more enjoyably adjusted.

Regression explains most of the infantile behavior of adults. When they face difficult adjustments, they simply regress to forms of behavior that worked when they were children. As judged by adult standards, this behavior is completely nonadjustive. It is no better than negativism and worry. It does not reduce tensions of maladjustment, and it does not lead to a state of happiness.

Regression explains many of our inadequate social customs. We regress to more primitive methods of adjustments when we face difficult adjustment problems. War is perhaps the best example of such regression. Many of our ritualistic customs are regressions to infantile and primitive forms of behavior. Codes of morality, legal procedures, forms of religious worship, patterns of education, precedents of government, mores of property ownership, customs of human justice, all contain elements of primitive and infantile carry-over that now have little or no adjustive value. To suggest that the scientific method be used in making some of these adjustments is to invite popular scorn and ostracism.

Whether in the individual or in society, regression is a procedure that leaves the adjustment problem unchanged. Fortunately, regres-

sion is not usually harmful either to society or to the individual. It is just a waste of time as far as making an adjustment is concerned.

TANTRUMS

The word *emotion* is used to designate two entirely different types of behavior—intense enjoyment and intense annoyance. (See Chap. III for further explanation of this distinction.) Intense enjoyment is not usually detrimental to personality development, but intense annoyance is. The emotions of annoyance are anger and fear, in various degrees and combinations. Psychologically, the greatest effect of these emotions is that they handicap the intelligence. Behavior is unrestrained and without benefit of intellectual inhibitions. Primitive wants are dominant and cultural restrictions are ignored. In addition to the fact that annoying emotion interferes with adjustment, it is detrimental to the body mechanism. It increases metabolic rate, interferes with digestion, steps up the production of blood sugar beyond that of actual need, increases muscular tension, and prepares the body for attack or flight whether or not either is justified.

Some people form habits of emotional release instead of emotional restraint. When they are thwarted, they become very angry or very much afraid. In either case, they behave like animals without intellect instead of like human beings with the power of intelligence. If the emotional release is relatively much greater than the restraint, the resulting behavior is called a *tantrum*. It may take almost any form, but it is always characterized by lack of restraint.

Emotion is a physiological condition brought about by action of the autonomic nervous system and is not subject to voluntary control. When adequate stimulation brings about this condition, there is no way to avoid it. It just goes with being human.

However, there are three ways an intelligent person can make the best of his handicap of becoming emotional. First, he can avoid the conditions that stimulate emotion. If he is afraid of snakes, he can stay away from them. If he becomes angry when others disagree with him, he can avoid arguments. Second, he can recondition his emotional reaction to the significant conditions. He can learn to like snakes. He can learn to argue without becoming angry. With few exceptions, any emotion producing stimulation can be reconditioned. Third, he can learn to act "like a gentleman" even when he is emotional. Gentlemen do not have tantrums, though they do become angry.

Tantrum habits are usually formed in homes where an adjustive

value is given to such behavior. To relieve a child's tantrum a parent will rescind a rule of discipline. Thus the child learns that if he can make the tantrum intense enough he will get what he wants.

Georgie B. was a little three-year-old boy who frightened his mother into granting all his wishes. When she denied him anything, he would fling himself on the floor, become rigid, hold his breath, and grit his teeth. One day the writer observed one of these episodes and quickly threw a glass of cold water in Georgie's face. The tantrum was never repeated.

Childhood tantrums must never succeed if adult tantrum habits are to be avoided.

HABITS THAT HAVE HARMFUL CONSEQUENCES

The habits of adjustment that have been discussed so far in this chapter are those that we commonly see all around us. We possess some of them ourselves and we observe others in our friends. They are not the most effective habits and we try to correct them, but they are not harmful. The rest of this chapter will be devoted to habits that lead to something worse. Psychoneuroses and insanities (discussed in Chap. VIII) are often caused by habits that were intended to aid the individual in overcoming his difficulties and satisfying his wants. The habits discussed in this section not only fail to effect an adjustment but they increase the maladjustment.

PHOBIAS

A phobia is an intense, morbid, unreasonable, uncontrolled fear. Its origin is in the forgotten past and usually so unpleasant that it is remembered only with great effort. It is frequently aroused by some symbolic representation of the original primary stimulation. It is an unpleasant, maladjustive reaction to a usually harmless situation. Perhaps a specific example will make its nature more clear.

Miss B. had a mouse-plus phobia. She was intensely afraid of both mice and basements, which she associated with mice. Her phobia was comparatively mild because she could talk about it without visible evidence of her feeling or emotional panic. However, it was a nuisance. The sight of a mouse made her "weak and faint for an hour afterward," and she had not been in her basement at home for seven years. She was thirty-two years old, principal of a grade school, and thoroughly ashamed of her phobia. If she were at home alone, and the house was cold, she would go to bed rather than go to the basement to fix the furnace fire.

The remedy for a phobia, like that for all other bad personality habits, is diagnosis and re-education. What caused the phobia in the

first place? How can habits of adjustment be learned instead? To illustrate this personality reformation, let us return to the case of Miss B.

Investigation revealed that Miss B.'s phobia originated from being playfully frightened by her brother with a dead mouse when she was in the first grade. Other boys soon found that it was fun to chase her with mice, sometimes real and sometimes pretended. Fortunately, when she was ten years old her parents moved to another town and the new schoolmates did not know about her fear. However, the damage had already been done. She had acquired a phobia that was to last more than 20 years. The basement attachment seemed to have originated from seeing mice in the basement at various times.

The re-education procedure began with the basement. First, the brother who was now married and thoroughly ashamed of his childhood prank, made sure that Miss B.'s basement was cleared of mice. Next, Miss B. went to the basement door and experienced the phobia for one-half minute every day until it was "worn out" for that location. She then stepped down a step and wore the phobia out there. This took another week. After several months, she could stand before the furnace without experiencing the phobia. Of course, she felt uneasy but it was not the phobia.

She then began on the mouse phase of her phobia. First, she read about mice and looked at pictures of them. She learned about how white mice are used to advance medical knowledge. She learned that mice never attack and never bite unless they are caught and held. Next, she bought a white mouse and kept it as a pet, in a cage of course. It was several weeks before she could feed it without experiencing the emotional panic. However, her persistent efforts were rewarded, and she was finally able to take the mouse to school and show it to the children. Today, the phobia, is entirely gone although her fear of mice is still "healthy."

There are many kinds of phobias and they have been given impressive names. A fear of high places is called acrophobia; of open places, agoraphobia; of closed places, claustrophobia; of darkness, nyctophobia; of crowds, ochlophobia; of disease, pathophobia; of fire, pyrophobia; of poisoning, toxophobia; and of animals, zoophobia. Whatever the nature of the phobia, it is a bad habit of attempted adjustment that leads to harmful results. It should be corrected under the guidance of a mental hygienist before it has done more serious psychological damage.

OBSESSIONS AND COMPULSIONS

An **obsession** is a persistently recurring idea that may be recognized as irrational but cannot be avoided. A **compulsion**, which results from an obsession, is a persistently recurring act that may be recog-

nized as irrational but cannot be avoided. For example, John Brown, of Harper's Ferry fame, had the obsession that he was divinely commanded to free the slaves. This compelled him to try to seize the arsenal at Harper's Ferry. Adolph Hitler was obsessed with the idea that he should rule the world. This compelled him to perform acts that are unparalleled in all history.

Compulsions are usually called *manias* (not to be confused with manic conditions discussed in Chap. VIII). The compulsion to steal is kleptomania; the compulsion to start fires is pyromania; the compulsion to alcoholic indulgence is dipsomania; the compulsion to count everything, such as steps, is numeromania.

Shakespeare gives us one of the most famous illustrations of a compulsion. After the murder of Duncan, Lady Macbeth is obsessed with the idea that "these hands will ne'er be clean." Even in her sleep she says, "Here's the smell of blood still: all the perfumes of Arabia will not sweeten this little hand."

The hand-washing compulsion is a common symbolic expression of an obsession of guilt for some immoral or unconventional act. Masturbation by one who believes it to be wrong often leads to excessive hand washing. In fact, hand washing is even found in religious rituals as symbolic of purification.

Obsessions and compulsions do not usually occur in those personalities that have developed the characteristic mentioned above—self-honesty. Realistic people seldom have obsessions. They recognize facts for their worth and check the truth of their ideas. Obsessions and compulsions do not necessarily indicate low intelligence, nor even the lack of education, but they usually do indicate the lack of realism and of self-honesty.

ANXIETY

When worry is accompanied with a constant fear of impending disaster, a condition of anxiety exists. Often worry becomes so intense that it arouses a state of fear. There is a continuous feeling of approaching doom and disaster. This is anxiety. It is one of the most harmful habits a person can form. It is a tremendous strain on the nervous system and cannot be endured for long. Either the difficulties that interfere with want satisfaction must be eliminated, or one of two tragic results will follow—death or insanity.

There are a number of characteristics of anxiety that make it easily identified. These may be listed as follows:

1. There is a feeling of insecurity, of inadequacy, of personal inability to cope with a situation.

2. There is the continual presence of morbid fear, fear that is intense and debilitating.

3. The object or condition of fear is in the future and intangible. It is some sort of impending doom.

4. There are resulting psychophysical tensions that interfere with digestion and even with sleep. It is almost impossible to relax. The individual is hypersensitive and irritable.

5. The difficulty that is at the base of these anxiety states may be either of the following:

a. Real and recognized by others. (Death is an example. However, healthy personalities do not worry about inevitable difficulties.)

b. Imagined and not recognized by others. (Personal ill-health is an example.)

The remedy for anxiety states (sometimes called anxiety neurosis) is twofold. First, it is necessary to remove the difficulty that interferes with satisfying the want involved. Often this is not easy to determine (especially if the want is related to sex). Even the patient himself does not know exactly what his want is. Sometimes it is easier to remove the patient from the scene of the difficulty than it is to remove the difficulty. A vacation trip, or a visit, or a change of jobs, will often correct a bad anxiety state. Second, it is important for the individual to be in good physical health. Healthy people do not worry easily, and when they do they seldom carry it to a state of anxiety. Good mental health and good physical health usually go together.

The bad effects of anxiety cannot be overemphasized. As Wallin¹ states so effectively, "Nervous anxiety may precipitate a vicious circle of disturbances, including hyperacidity, which may lead to duodenal ulcer, and dyspepsia, which, in turn, may lead to gastric atony (lack of tone) and dilation. These lead to visceroptosis (downward displacement of the visceral organs), to intestinal stasis, to toxic absorption, to endocrine disorder, and back to nervous anxiety."

REPRESSIONS

Society disapproves of the satisfaction of some human wants. In fact, it disapproves of having some wants at all. For example, sex wants in unmarried people are regarded as indecent. Even in married people they are often regarded as base and carnal. This is likewise

¹ Wallin, J. E. W., *Personality Maladjustments and Mental Hygiene*, McGraw-Hill Book Company, Inc., New York, 1935.

true of the want to wear clothing that is not in fashion. A college professor would be severely reprimanded if he should appear before his class in a swimming suit, or even in slacks and sweatshirt. Consequently, when a person has wants of which society disapproves (especially regarding sex), he either represses them or keeps them secret. If he has been trained to "keep his mind clean," he dares not have "evil" wants even in secret. The other alternative is to repress them.

The repression of a strong want does not eliminate it. The want for food, for example, might be ignored for a time, or called by another name, or even denied, but it does not cease to exist for these reasons. It may vary in intensity or even disappear for some other reason, but it is not eliminated by repression.

To repress a socially disapproved want is really to drive it under cover. It becomes known by another name and treated as another want. Consequently it is not satisfied and tensions of maladjustment are not relieved. Psychologically, a repressed want is much worse than the evil of admitting that it exists.

The social taboo of many wants (especially sex) has the prestige of religious approval. Children are taught, not that these wants are merely unconventional, but that they are forbidden by God. Consequently, when the want arises there is a conflict between the want itself and the want to satisfy God. This becomes a major psychological problem. The individual now has two opposing wants—the unconventional or "evil" want, and the want to act in accordance with his training, which he now calls his "conscience." The stronger the wants are, the greater the conflict and the greater the state of maladjustment.

It is always difficult to bring a conflict between a repressed want and a strong conscience out into the open. The reason is that the individual has unconsciously tried to pull a fast one on himself. He has tried to satisfy both wants without appearing to do so. The "evil" want has been changed and replaced by more decent ones. He has deceived himself into believing that the evil want no longer exists. Consequently, the individual himself does not know what wants are involved in a conflict.

Mary R. was a school teacher who was becoming worried and nervous because "life was slipping by so fast." She took a summer course in mental hygiene and was required to write a paper analyzing some problem of adjustment. She analyzed her own sex adjustment and stated the following facts as significant.

She was taught by her mother that sex was evil and interest in it should be

repressed. "Nice little girls do not even think of sex." Consequently, she never masturbated, never listened to sex discussions even in college, and never was interested in boys except on an intellectual basis as fellow students. As a school teacher, she ignored sex but now wonders if sex has ignored her. She was shocked to learn from her textbook in mental hygiene that sex is a physiological drive and no more evil than hunger if it is satisfied in an approved manner. She realized now that her own sex wants have been entirely repressed by the idea that they were evil.

The recognition and fairly detailed description of her problem was as far as her analysis went, at least in the paper submitted in class.

A prominent procedure of diagnosing personality conflicts is called *psychoanalysis*. It has changed somewhat since Freud originated it about the close of the last century, but it is still too complicated to attempt to explain here.¹

FANTASY

Planning is a process of imagining how a proposed adjustment will work out when it is tried. It is a preparatory step to further adjustment. Daydreaming is a process of imagining that an adjustment has already been made. It is an end in itself and does not lead to further adjustment. Fantasy is a process of imagination that has nothing to do with adjustment at all. It is an end in itself. In fact, fantasy is a means of escape from the thought of disagreeable adjustment problems. It is not a substitute for adjustment, as are daydreams; it is a substitute for life itself. A world of fantasy is substituted for a world of reality. Fantasy is an escape from a real world with all its limitations to a world where there are no limitations.

Fantasy is dangerous because it is but one step to delusion and hallucination. Exaggerated imagery may become so real that voices are heard or visions are seen that do not exist. Imagined beliefs may be accepted as true regardless of evidence to the contrary. When one lives too much in a world of fantasy, it is easy to confuse the imagined world with the world of reality. (Such a confused state of mental illness is discussed more fully in Chap. VIII.) Excessive fantasy is usually an indication that a serious mental breakdown is not far off.

The individual may picture himself as a conquering hero who performs mighty deeds of valor, acquires the things he most desires, and is

¹ Brief explanations of psychoanalysis may be found in Chap. 14 of L. F. Shaffer's book, *The Psychology of Adjustment*, Houghton Mifflin Company, Boston, 1936, or B. Hart's *The Psychology of Insanity*, Cambridge University Press, London, 1920, or R. S. Woodworth's *Contemporary Schools of Psychology*, Chap. 5, The Ronald Press Company, New York, 1931.

acclaimed by all his acquaintances. However, this is more frequently on the level of a compensation daydream and not as serious as other types of fantasy.

The suffering-hero type of fantasy pictures the individual as a victim of discrimination, abuse, and mistreatment. He imagines that others are plotting against him and planning to harm him. Even nature is unjust and unfair to him. He is an innocent victim of enemies and conditions. Actually there is no factual basis for such fantasy at all.

The most frequent type of fantasy is a sort of a reverie that runs on and on in a storybook fashion. The individual himself is the leading character. His experiences are enjoyable and exciting. Thus, he is able to escape from real life into a more enjoyable life of fantasy.¹

The remedy for fantasy is to establish the characteristics of good mental health mentioned earlier in this chapter. No one wants to escape from the real world to a world of fantasy unless the real world is becoming intolerable. The person who spends his time in fantasy needs help in making his real world adjustments. Then, an occasional flight into fantasy will do him no harm.

SUMMARY

This chapter has briefly reviewed one of the most important fields of applied psychology. No one ever forms such adequate habits of adjustment that there is no need for improvement. Mental hygiene can profitably be used by everyone. No other phase of psychology is applicable to so many people as is mental hygiene.

Habits that produce adequate adjustments were reviewed briefly. It was recommended that easy and less important adjustments be effected by trial and error and that more difficult adjustments be made by the scientific method. Many of the characteristics of good mental health were mentioned.

Then, habits that are only partly effective were discussed. These are habits of compensation (such as daydreaming, identification, overemphasis, delinquency, sublimation), habits of rationalization, and habits of evasion. We all make partial adjustments by these methods, but if we are well adjusted we do not use them habitually when other methods would be more appropriate.

The habits that produce no adjustment are worry, negativism,

¹ If he can record his fantasies in writing, he may be able to market it as literature. More than one novel has been a by-product of an unhealthy mental condition. Thus an attempt to escape adjustment may lead to adjustment.

regression, and emotional tantrums. They do not relieve the tensions of maladjustment, and they produce no satisfaction.

Five categories of harmful adjustment habits were discussed. They all lead to psychoneuroses and more serious maladjustments. Phobias, obsessions, anxieties, repressions, and fantasies are all habits to be avoided. They increase the state of maladjustment and lead to some of the abnormal conditions discussed in Chap. VIII.

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CHAPTER VII

PSYCHOLOGICAL EFFECTS OF NUTRITION, DRUGS ALCOHOL, AND TOBACCO¹

Nutrition

- Physiological and Psychological Bases of Appetite
- Effects of Restriction of Food Essentials

Drugs

- Benzedrine Sulfate
- Coffee, Tea, Cocoa
- Metrazol and Insulin
- The Barbiturates
 - Phenobarbital
 - Sodium Amytal
- The Bromides
 - Dilantin Sodium
- Opium, Morphine, Heroin
- Cocaine
- Marijuana

Alcohol

- Physiological Background of Effects
 - Absorption
 - Distribution
 - Elimination
- Effects of Alcohol
 - Sensory Functioning
 - Motor Functioning and Coordination
 - Intellectual Functioning
 - General Effects
- The Alcoholic Disorders
 - Acute Alcoholism
 - Chronic Alcoholism

Tobacco

The behavior of a human being is determined not only by such factors as heredity, stage of maturation, present constitution, and environmental experiences, but also by the substances he consumes to provide nourishment for his body, or to give him relief from worry, pain, or sleeplessness, or simply to give him pleasure.

NUTRITION

Frequently the substances consumed for nourishment are inadequate for the needs of the individual, and alterations in health and

¹ This chapter was written by Erma T. Wheeler, instructor in psychology at the University of Pittsburgh.

behavior occur. Either insufficient food or food of poor quality may affect general efficiency. In fact, all processes occurring in normal functioning including mental, physical, and emotional, are dependent upon the nutrition of the parts of the body involved in producing the behavior.

The two chief purposes of food are to maintain the chemical structure of the body and to supply it with energy for the body's work. Dietary problems are concerned chiefly with these two functions. Accordingly, diet is considered in terms of the number of calories required per day and in terms of its division into protein, fat, carbohydrate, minerals, water, vitamins, etc. Either or both of these two requirements may not be fulfilled; *i.e.*, calorie intake may be too high or too low, or one or more of the food elements may be lacking or be present in unfavorable proportions to the other elements. A proper ratio between calories and vitamins, for example, must be maintained; vitamin intake must not be too low in proportion to calorie intake.

PHYSIOLOGICAL AND PSYCHOLOGICAL BASES OF APPETITE

From experimental studies we can definitely conclude that there is a basic hunger for certain essential food elements in certain definite proportions. Davis¹ demonstrated that young children usually select an assortment of foods such as is required to meet their bodily needs. Presented with an array of foods each day, even though they may choose only one food and eat it exclusively for a time, preference will eventually shift to another food so that in the end a balanced diet is obtained. Richter² demonstrated that rats will likewise select a correct diet. Presented with several dishes of food, in each of which is one food such as fat or sugar, a rat will eat from each dish an amount that is about right for his normal functioning.

The growing child needs relatively more food suitable for maintenance and construction of tissues than does the adult, and since he expends energy more rapidly he needs relatively more foods yielding energy. The daily needs increase from infancy to around the fourteenth or fifteenth year for girls and to the sixteenth year or later for boys.

Abnormalities of appetite may occur so that food intake is too high or too low. When appetite and food consumption are too high for body needs, we may be dealing with endocrine dysfunction, with com-

¹ Davis, C. M., Self-selection Diet by Newly Weaned Infants, *Amer. J. Dis. Child*, 1928, **36**, 651-679.

² Richter, C. P., Physiological Psychology. *Annu. Rev. Physiol.*, 1942, **4**, 561-574.

pensation for loneliness or feelings of insecurity, with boredom, or simply with habit. An example of the probable combination of two of these suggested factors occurs in women after menopause. At this period of life endocrine changes bring about a reduction in metabolism that, coupled with a reduction in physical activity, results in lower food requirements. If former eating habits are maintained, obesity may occur. In many instances the change in appearance is accompanied by unhappiness over the loss of physical attractiveness. In children Bruch¹ has found that overeating and obesity may be the child's way of compensating for feelings of insecurity concerning the love of his parents or for feelings of insecurity in general. Treatment of obesity with endocrine therapy in cases such as these fails to bring about a change since the difficulty rests upon a psychological basis.

When appetite and food consumption are too low, some of the possible causes are physical dysfunction, mental illness, poverty, ignorance of proper food requirements, or habit. On restriction of food intake, and especially on vitamin restriction, the bulk of experimental work has been done with animal subjects. In using human subjects, difficulties are encountered in attempting to control other variables that might affect results. Also it is dangerous to induce extreme degrees of food deficiency in human beings.

EFFECTS OF RESTRICTION OF FOOD ESSENTIALS

The effect of poor diet on human subjects was studied by Seymour and Whitaker.² These experimenters used 50 underprivileged children of six and one-half years of age, dividing them into an experimental and a control group, each having the same average intelligence. The experimental group was given a nourishing breakfast at school while the control group continued to eat their usual inadequate breakfast at home. Both groups were taught in the same class over an 8-week period. The experimental group showed 7 to 10 per cent more gain in English and arithmetic than did the control group; they also did better on standard tests. Differences became apparent the tenth day of the experiment and subsided 1 week after the breakfasts were discontinued. Before drawing the conclusion that a deprived diet results in inferior achievement, one would have to speculate on the

¹ Bruch, H., Obesity in Childhood: III. Physiologic and Psychologic Aspects of Food Intake of Obese Children, *Amer. J. Dis. Child.*, 1940, **59**, 739-781; Bruch, H., Obesity in Childhood and Endocrine Treatment, *J. Pediat.*, 1941, **18**, 36-56.

² Seymour, A. H., and Whitaker, J. E., An Experiment on Nutrition, *Occup. Psychol.* 1938, **12**, 215-223.

possibility that the experimental group may have felt more cooperative in the school situation as a result of the excellent breakfast provided at school, while the control group may have felt neglected and uncooperative. This example will illustrate the difficulty of controlling variables that may enter into the results when using human subjects.

When food essentials are restricted from the rat's diet, it shows a craving for them (Richter¹). If some food element, such as sugar, is removed from the diet and the rat is presented with dishes containing the restricted element and other foods, it will then select the needed food first. In the case of vitamins, deficiency of vitamins A and D does not seem to be accompanied by specific vitamin hunger. Wilder² demonstrated that rats deprived of these vitamins gave no evidence of preferring foods containing them. But with vitamin B, or its factors, deprivation resulted in a definite and avid hunger for food containing the missing vitamin B component. This behavior is especially interesting when we consider the fact that vitamin B deprivation results in loss of appetite for other foods.

Because of the effects of the vitamin B group on the nervous system and behavior, research on the restriction of this vitamin is of particular interest to us. Using rats as subjects, Patton, Karn, and King³ found that vitamin B₁ deficiency and inanition are important factors in increasing the susceptibility of rats to convulsive seizures induced by high-pitched sounds. Wickens⁴ and Biel found that animals deficient in vitamin B were significantly slower in learning a conditioned eyelid response than were rats on normal diet.

In human beings O'Shea and Elsom⁵ found a decline in scores on the Porteus maze test in forty-three- to sixty-five-year-old women on a diet kept low in vitamin B for 62 to 98 days and an increase in scores after vitamin B was administered. Scores in general intelligence,

¹ *Op. cit.*

² Wilder, C. E., Selection of Rachitic and Antirachitic Diets in the Rat, *J. Comp. Psychol.*, 1936, **24**, 547-577.

³ Patton, R. A., The Effect of Vitamins on Convulsive Seizures in Rats Subjected to Auditory Stimulation, *J. Comp. Psychol.*, 1941, **31**, 215-221; Patton, R. A., and Karn, H. W., Abnormal Behavior in Rats Subjected to Repeated Auditory Stimulation, *J. Comp. Psychol.*, 1941, **31**, 43-46; Patton, R. A., Karn, H. W., and King, C. C., Studies on Nutritional Basis of Abnormal Behavior in Albino Rats, *J. Comp. Psychol.*, 1941, **32**, 543-550.

⁴ Wickens, D. D., and Biel, W. C., The Effects of Vitamin B₁ Deficiency on the Conditioning of the Eyelid Response in the Rat, *Psychol. Bull.*, 1940, **37**, 478.

⁵ O'Shea, H. E. and Elsom, K. O., Studies of B Vitamins in the Human Subject: IV. Mental Changes in Experimental Deficiency, *Amer. J. Med. Sci.*, 1942, **203**, 358-387.

reasoning, and speed of eye-hand coordination did not decline. These investigators conclude that foresight and judgment are impaired by vitamin B deficiency. The use of only four subjects should cause us to withhold judgment until more experimental work has been done on a larger and younger group. Four other subjects studied by Williams¹ and his collaborators showed reduction in capacity for work when maintained on a low vitamin B₁ diet for 10 to 14 weeks.

The most striking findings of vitamin B effects on behavior result from clinical observations. Williams² and his collaborators restricted the vitamin B (thiamin) intake of 11 women institutionalized for mental disorder but showing no symptoms of emotional instability at the time the experiment was started. These subjects were restricted to 45 mg. daily, an amount only slightly, if any, below the average American diet. In 6 to 8 weeks the subjects became quarrelsome, uncooperative, moody, irritable, fearful, and depressed. With restoration of proper vitamin B balance, these symptoms disappeared.

An even more striking example of mental disturbance resulting from the effect of nutritional deficiency is seen in pellagra, in which disease the skin, gastrointestinal tract, and nervous system are affected. The patient is nervous, weak, and depressed and may be confused, hallucinated, disoriented, and delirious. Tremors and rigidity of the body occur. If such cases are given prompt and intensive treatment including a balanced diet, they usually recover; if untreated, they will likely become insane. A poorly nourished brain and nervous system does not function any better than does a poorly nourished muscular system.

In studies on vitamin A, it has been found that deficiency of this vitamin is one of the factors that may produce night blindness in human subjects, since it is needed in the resynthesization of the visual purple of the retina necessary in adapting the eyes to faint illumination. This is an important factor in night driving. We shall have occasion to refer to this effect again in our discussion of alcohol.

It is probable that a sufficient intake of all vitamins—A, B complex, C, D, E, and K—is essential to proper functioning of the human organism although in studies so far conducted vitamin K has not been found to be related to behavior.

¹ Williams, R. D., Mason, H. L., Wilder, R. M., and Smith, B. F., Observations in Induced Thiamine (Vitamin B₁) Deficiency in Man, *Arch. Intern. Med.*, 1940, 66, 785-799.

² Williams, R. D., Mason, H. L., Wilder, R. M., and Smith, B. F., Induced Thiamine (B₁) Deficiency and the Thiamine Requirement of Man: Further Observations, *Arch. Intern. Med.*, 1942, 69, 721.

Due to limitations in space it is possible to cover only briefly a few of the studies on some of the food elements and some of their influences on behavior. We can conclude even from this limited survey that we find not only a craving for certain elements of diet when they are lacking but also a resulting disturbance of physical, emotional, and mental behavior.

It has become evident that inadequate diets are fairly common. As a result an estimated one-third of the population have nutritional difficulties of one sort or another in varying degrees. Refinement of foods, of which decortication of cereals is one example, has contributed to this situation. Our forefathers, who consumed their food in its form fresh from the garden, were, in this respect, fortunate.

There are other conditions that may result in inadequate diet besides the quality and quantity of food. Alcoholism, or infections such as tuberculosis and syphilis, reduce the individual's ability to utilize his foods. Organic defects in the body systems or organs, directly or indirectly concerned with nutrition, may induce a similar result. Voluntary restrictions of food intake, without medical supervision, in order to reduce weight, may result in dangerous elimination of essentials from the diet.

The claims of faddists that consumption of a certain food, such as meat, may result in a certain temperament, such as a pugnacious one, are entirely without substantiation either by experimental studies or by clinical observation. But the general nutritional state of the organism or deprivation of an essential food element may definitely cause change in behavior.

DRUGS

Drugs, or the exogenous toxins, furnish one of the best examples of the influence upon his mental life and behavior of substances consumed by the human organism. These substances enter the blood stream and tissue juices so that cell environment is changed. Nerve-cell activity may be disrupted, altered, or blocked, with resulting changes in mental, emotional, and physical behavior.

Even in ancient times the primitive peoples sought pleasure and relief from the stresses of life by indulging in some form of intoxicant. Each culture, it seems, has discovered some substance that serves the purpose. The Asiatics have used opium or a drug called "hashish," which they obtain from Indian hemp, while the Northern Europeans and Americans have resorted to ethyl alcohol.

Prescribed by the physician in dosages carefully regulated to the needs of a particular individual, drugs have been a boon to man-

kind. Taken in dosages too large for a particular individual, or taken at all in the case of the highly susceptible person, they become violent poisons. It is for this effect that we use the word "intoxication," which means a state of being poisoned. Further, if drugs are taken habitually and inadvisably, they may cause serious physical and mental disorders. One of the major threats in the whole drug problem lies in the fact that certain of the drugs are habit-forming and so lead to addiction. If drugs did not have this habit-forming property, it is probable that the resulting disorders would be few.

Many have fallen into addiction without full realization that they were doing so. Often the drug has been used legitimately by a physician's prescription for relief of pain, nervousness, or sleeplessness. At a moment of stress the patient recalls the relief once found in the use of the drug and resorts to it again. Some fall into addiction as a result of experimental use or upon the advice of others. Hall¹ found in his study of 37 women addicts that 22 had started use upon the advice of friends, 13 upon the experience first obtained by physician's prescriptions, and 2 had first used the drug on their own initiative. Once addiction has occurred, withdrawal effects are so intolerable that the patient is unable to break off. The commonest of these discomforts are restlessness, sleeplessness, intolerable nervousness, muscular weakness, aches, pains, and nausea.

An explanation of why certain people become addicts is still lacking. A possible clue lies in the fact that the same drug affects different people in different ways, both in respect to the amount that can be taken and in respect to the reaction to a specific amount. With the commonly used bromides, some individuals become sleepy with 10 grains. Others show no effect at all from that amount, while still others are so poisoned that they develop a severe rash. The basis of tolerance for drugs must have a physiological explanation, and the man who has a tolerance or builds up a tolerance for increasingly large doses is obviously in more danger of becoming an addict than one who is too narcotized or too stimulated by a small dose to need more.

Individual differences in tolerance to drugs make it difficult to make a statement as to the effect of any drug upon a specific individual. A dosage that has slowed down the general behavior of most individuals may have no effect at all on some other individual and excite still another. Further, 10 grains of a specific drug have produced certain effects upon the members of a group of experimental subjects while

¹ Hall, M. E., Mental and Physical Efficiency of Women Drug Addicts, *J. Abnorm. Soc. Psychol.*, 1938, **33**, 332-348.

20 grains of the same drug have drastically altered or even reversed those effects.

Still further variations in drug effects due to individual differences are found in the fact that some persons develop psychoses as a result of addiction, such as the delirium tremens from alcohol, while others do not. Although no one seems to be immune from the drunkenness of a toxic dose, not all alcohol addicts develop alcoholic mental disorders. The same may be said of the effect of such drugs as opium.

Further, it does not even require habitual use of drugs to disturb the mental integrity of persons with less stable nervous systems. They may be thrown into severe disorder by ingestion of certain drugs. Alcoholic intoxication, for instance, may produce cerebral edema (wet brain), which in the normal, healthy individual may have no great significance but which in the epileptic, already affected with cerebral dysrhythmia, may be the basis of an epileptic seizure. Alcohol is contraindicated in epilepsy, yet the epileptic in most cases responds favorably to phenobarbital or delantin sodium properly prescribed.

As a consequence of the complexity of the factors involved, in evaluating drug effects conclusions must always be carefully qualified in terms of other factors that may have determined the results besides the drug itself. Size and concentration of dose, acquired and individual tolerance, condition of the subject, ingestion of foods, liquids, and other substances, body weight, age, amount of exercise and sleep, and even the knowledge that he has taken a drug, all may be as important in evaluating results as the nature of the drug itself. These variables must be kept in mind as we review the experimental and clinical findings.

Due to more drastic drug legislation most of the drugs that alter behavior have become difficult for the layman to obtain. Several drugs that are easy to secure because society shows either partial or no disapproval of their use are caffeine, as found in coffee and tea, nicotine as found in tobacco, and ethyl alcohol, as found in alcoholic beverages. Due to the widespread use and important effects of the last-named two, they will be discussed as separate topics.

BENZEDRINE SULFATE (AMPETAMINE SULFATE)

In its effect, benzedrine resembles epinephrine, a substance produced by the suprarenal gland of the body, except that benzedrine has greater ability to stimulate the higher centers, particularly the cortex, and does not dilate the blood vessels. In fact peripheral blood vessels are constricted. In other respects it shares with epinephrine and

ephedrine the ability to stimulate effector organs. Blood pressure is elevated, the pupils dilated, the heart muscle stimulated as are also the cerebrospinal axis and especially the brain stem and cortex.

In fact benzedrine has the most potent action on the central nervous system of all the drugs that are capable of stimulating or inhibiting sympathetic nerves. For that reason it is a useful drug in the treatment of narcolepsy, a strange disorder that causes the individual to fall asleep suddenly, even while he is working, driving, or indulging in other activities. It lightens anesthesia and has been used to shorten the period of postoperative unconsciousness. Combined with other measures it has been used in lessening the depression produced by hypnotics (sleep-producing drugs.) Reifenstein and Davidoff,¹ for instance, found that the anesthesia produced by .5 g. sodium amytal, injected intravenously, was abolished by 10 to 30 mg. benzedrine likewise injected. In alcoholic addiction it sometimes assists the patient in abstaining from alcohol. It has been employed as a stimulant in acute alcoholic stupor and in the treatment of alcoholic psychoses, as well as in some fatigue and depressive states.

Not only from the clinical field do we obtain evidence that benzedrine is a powerful stimulant of the central nervous system, but also from numerous experimental studies of both psychic and physical effects. These effects depend upon the dose administered and upon the mental state and personality of the patient. The main results obtained after oral dosage of 10 to 30 mg. of the drug are temporary increase in efficiency, confidence, alertness and willingness, an elevation of mood with elation, lessening of fatigue, increased motor and speech activity, increased ability to concentrate, sleeplessness and irritability. The effects are not always as described in all people. Agitation, delirium, depression, and fatigue may be the result in some individuals—in other words, a severe exaggeration or a reversal of effects. Larger doses or continued dosages are followed by fatigue and depression.

Studying the effects of benzedrine in a controlled situation, Carl and Turner² used 143 adults as subjects dividing them into four groups according to size of dosage. Lactose was used as a control dose and as the two substances are identical in appearance, the subjects did not know which was being used or in what dosage, although they knew

¹ Reifenstein, E. C., and Davidoff, E., *Intravenous Benzedrine Sulfate as an Antagonist to Intravenous Soluble Amytal*, *Proc. Soc. Exper. Biol. & Med.*, 1938, 5, 181-184.

² Carl, G. P., and Turner, W. D., *The Effects of Benzedrine Sulfate on Performance in a Psychometric Examination*, *J. Psychol.*, 1939, 8, 165-216.

the nature of the experiment. Comprehensive psychometric examinations and devices for estimating changes in feeling, mood, and attitude were employed. The results indicate that the benzedrine groups showed higher efficiency at the end of 4 hours in most types of work calling for mental effort and psychomotor output. This effect was not due to an increase in mental ability but to a more favorable mood toward tasks calling for persistence, alertness, and freedom from fatigue. Although the above result was secured with moderate (10 mg.) dosage, heavy dosage (10 to 20 mg.) produced retardation.

Since benzedrine is a cerebral stimulant many investigators have explored the possibility of an increase in intelligence test scores under benzedrine medication. Although that result was obtained by some investigators, in no case was it demonstrated that the differences obtained between the nondrug control group, and the experimental benzedrine group were significant. Barmack¹ administered the Otis Self-Administering Tests of Mental Ability (higher form) to 42 college students using 10 mg. benzedrine sulfate and placebo as a control dose. Benzedrine was found to be without favorable effect upon the Otis scores. This drug has been used in many studies upon problem children, and favorable effects upon behavior have been noted. These changes were in a subdued emotional behavior and better school performance.

In general, benzedrine in small doses exerts a favorable effect on psychological functions. Individuals, however, vary in their reaction to the drug and even small doses may elicit alarming symptoms in some persons due to idiosyncrasy. There is danger of drawing too heavily upon physical reserves without the warning of fatigue in using this drug.

COFFEE, TEA, AND COCOA (CAFFEINE, THEOPHYLLINE, AND THEOBROMINE)

Caffeine, theophylline, and theobromine are drugs that are similar in chemical constitution and action although they differ greatly in the intensity of their effect on various structures. Table 85 presents their relative potencies as described by Goodman and Gilman.² These drugs are found in a large number of plants widely distributed throughout the world. Wherever the plants grow it is interesting to note that the natives have brewed them for a beverage. Coffee and

¹ Barmack, J. E., The Effect of Benzedrine Sulfate upon the Report of Boredom and Other Factors, *J Psychol.*, 1933, 5, 125-133.

² Goodman, L., and Gilman, A., *The Pharmacological Basis of Therapeutics*, p. 275, The Macmillan Company, New York, 1944.

the cola drinks containing caffeine, tea containing both caffeine and theophylline, and cocoa containing theobromine are widely used today.

According to an early legend, shepherds observed that goats that had eaten of the coffee berry did not rest but gamboled and frisked about all night. A prior, who wished to stay awake to pray, instructed the shepherds to bring him the berries so that he might make a brew for his own use, and so came the discovery of coffee. From such old tales

TABLE 85.—RELATIVE POTENCIES OF CAFFEINE, THEOPHYLLINE, AND THEOBROMINE†

Drug	Central nervous system	Respiratory stimulation	Diuresis	Coronary stimulation	Cardiac stimulation	Skeletal muscle stimulation
Caffeine.....	1*	1	3	3	3	2
Theophylline...	2	2	1	1	1	3
Theobromine .	3	3	2	2	2	1

* 1—most potent.

† From Goodman, L. and Gilman, A., *The Pharmacological Basis of Therapeutics*, p. 275, The Macmillan Company, New York, 1944.

as this we can infer that the stimulating nature of the drugs has long been known.

A cup of coffee contains about $1\frac{1}{2}$ grains of caffeine while tea contains only slightly less, if any, of the active agent when brewed. There is little doubt that these beverages are often consumed for their stimulating effect even though most drinkers are unaware of the stimulation. This property probably forms the basis of their popularity and results in a true, though usually harmless, addiction. Here, as with other drugs, the degree to which the individual is stimulated depends upon personal tolerance. For most people, one cup of coffee has negligible effects, but there are some rare cases in which results bordering on the toxic are caused by this amount including insomnia, restlessness, and excitement. In some persons 1 or more grams may produce delirium. The fatal oral dose is estimated to be 10 g., although no deaths have been reported from this cause.

Hollingworth's¹ study of caffeine effects on psychological functions has withstood the test of subsequent research, which uniformly shows this drug to shorten reaction time. Although experiments have reported it to exert rather conflicting effects on mental functioning,

¹ Hollingworth, H. L., *The Influence of Caffeine on Mental and Motor Efficiency*, *Arch. Psychol.*, N.Y., 1912, No. 22.

the general effect seems to be in the direction of a slight increase in efficiency.

Thornton, Holck, and Smith¹ compared the effect of caffeine and benzedrine on certain psychomotor tasks—three reaction-time tests, three tapping tests, hand grip, maintained hand grip, and a steadiness test. A control dose of lactose was used. Three subjects were given 35, 24, and 34 experimental sessions. All made better average scores on benzedrine days than on lactose days. The difference between benzedrine and lactose in favor of benzedrine was greatest for steadiness and maintained hand grip, and least for reaction time. Caffeine scores were better than lactose scores for all tests except steadiness and one reaction-time result. The effects of benzedrine and caffeine were in opposite directions on steadiness, benzedrine increasing it, caffeine decreasing it. But the effects varied with the subject and the task.

A further effect is reported by Kravkov² who found that caffeine increases the sensitivity of the eye to red-orange and to green colors, the effect beginning 20 minutes after ingestion and lasting over 40 minutes.

In general, coffee, tea, and cocoa are stimulants, causing reaction time to shorten, mental efficiency to increase slightly with moderate dosages, steadiness to decline, and the eye to become more sensitive to red-orange and to green. Once again, there is danger of drawing on physical reserves without the warning of fatigue when using these drugs.

METRAZOL AND INSULIN

These drugs have been used extensively in the treatment of mental disorders. They are discussed in Chap. VIII.

THE BARBITURATES (BARBITAL OR VERONAL, PHENOBARBITAL OR LUMINAL, SODIUM AMYTAL, PENTOTHAL, ETC.)

The barbiturates compose an important group of central-nervous-system depressants and have been in wide use both by physician's prescriptions and by self-dosage.

The major use of these drugs is for their calming, or sedative, and their sleep-producing, or hypnotic, effect. Any degree of depression from light sedation to deep coma may be obtained from the barbiturates. They are employed to reduce nervousness, depress the motor cortex and so inhibit convulsions, induce a refreshing sleep, and

¹ Thornton, G. R., Holck, H. G., and Smith, E. L., The Effect of Benzedrine and Caffeine upon Performance in Certain Psychomotor Tasks, *J. Abnorm. Soc. Psychol.*, 1939, **34**, 96-113.

² Kravkov, S. V., The Effect of Caffeine on Color Sensitivity, *Vestn. Oftal.* 1939, **14**, 61-63.

bring about a complete or partial anesthesia. The intensity of their action depends upon the barbiturate selected, the dose, the manner of administration, and the idiosyncrasy of the subject. The sedative dose is about one-third or less of the hypnotic dose. About 15 times the oral hypnotic dose usually depresses the respiratory center sufficiently to cause death. Death from ordinary therapeutic doses is unknown except in rare cases with complicating circumstances. In between the hypnotic and fatal dose intoxication may occur, with excitement, delirium and hallucinations, followed by lethargy, deep sleep, or coma.

Idiosyncrasy to the barbiturates usually shows itself in the form of a hangover, excitement, or pain. In some individuals these drugs always cause excitement instead of sedation, and the individual appears inebriated. Acquired idiosyncrasy consists of reaction of an allergic nature such as skin reactions. All of the barbiturates have the same general depressant effect upon the cerebrospinal axis, but they differ somewhat in the dose in which they are effective, in the speed of their action, in the duration of their hypnotic effect, and in their ability to accomplish a certain specific purpose.

Phenobarbital or luminal is the second oldest of these drugs, having been preceded by barbital (veronal). It is preferred to the newer drugs for certain specific purposes although it is longer acting and may produce a hangover. All of the barbiturates will inhibit the convulsions of tetanus, strychnine poisoning, and epilepsy in anesthetic doses, but phenobarbital has a selective action on the motor cortex.

Keller and Fulton¹ found that this drug alone, of several barbiturates studied, was able to abolish completely the electrical excitability of the motor cortex of monkeys if given in anesthetic doses, while Merritt and Putman² found that even sedative doses of phenobarbital were more effective in preventing convulsions in cats than any other barbiturate studied. The last two experimenters induced convulsions in the experimental animal by stimulating the motor cortex electrically. In human subjects Lennox³ found that in 766 noninstitutionalized patients, 65 per cent were improved by this drug in respect to seizures.

Sodium Amytal.—The barbiturates have frequently been used for sedation in the mental disorders. It was found that patients

¹ Keller, A. D., and Fulton, F. J., The Action of Anesthetic Drugs on the Motor Cortex of Monkeys, *Amer. J. Physiol.*, 1931, 97, 937.

² Merritt, H. H., and Putman, T. J., A New Series of Anti-convulsant Drugs Tested by Experimentation on Animals, *Arch. Neurol. Psychiat.*, 1932, 27, 836-846.

³ Lennox, W. G., The Drug Therapy of Epilepsy, *J. Amer. Med. Ass.*, 1940, 114, 1347-1354.

frequently awakened improved, if prolonged sleep had occurred. Further, when sodium amytal or pentothal were used, patients who had been in a deep depression or stupor, refusing to eat or talk, often began to talk freely even confiding their secret conflicts, ate without urging, and acted more normally. Psychiatrists began to use these drugs as an aid to analysis and treatment of mental cases.

Linderman¹ studied these effects under controlled conditions, using as subjects 30 mental patients and 6 normal graduate students trained in introspection and psychology. The subject was placed on a couch and a solution of crystallized sodium amytal was injected intravenously. Before dosage the patient had been confronted with a series of questions related to his name, age, situation responsible for his being brought to the hospital, and his outlook for recovery. After the injection of the first 2 or 3 grains of amytal these questions were repeated. The maximum dose used in any case was $4\frac{1}{2}$ grains. In the mental patient, the drug broke down the wall erected by the patient so that he could reveal the stress situation. A striking change occurred from resistance and seclusiveness to a friendly, warm, confiding attitude. In the normal subjects, the effects were a feeling of well being, a desire to communicate, to be everyone's friend, a feeling that the subject could accomplish anything he attempted, and a desire to reveal intimate problems. Linderman concludes that, like alcohol and some of the other drugs, amytal removes certain cortical inhibitions, but with this drug the release is for words rather than for actions.

In general the barbiturates have a sedative or hypnotic effect upon the individual, uniformly depressing the psychological functions. According to a review by Spragg² of experimental studies, where functions increase, the effect is usually attributable to depression of inhibitions. Experimental and clinical psychologists must frequently evaluate the results of their studies with careful consideration given to the possible effects of barbiturate medication when it has occurred in their subjects.

THE BROMIDES

These salts are also depressants of the central nervous system. Their other effects are more or less undesirable, being of a toxic nature. In proper doses they cause calmness, sedation, drowsiness, and sleep,

¹Linderman, E., Psychological Changes in Normal and Abnormal Individuals under the Influence of Sodium Amytal, *Amer. J. Psychiat.*, 1932, 11, 1083-1091.

²Spragg, S. D., The Effect of Certain Drugs on Mental and Motor Efficiency, *Psychol. Bull.*, 1941, 38, 354-355.

although the sleep produced is not as refreshing as that caused by the barbiturates and there may be a hangover. In large doses, intellectual processes are disturbed, as are speech and motor movement. In still larger doses, delirium and coma appear.

Dilantin Sodium.—Merritt and Putman¹ in an elaborate experimental of anticonvulsant drugs, found dilantin to have the greatest anticonvulsant effect combined with the least hypnotic effect of the many drugs studied. The drug is a very desirable one in the treatment of epilepsy since the patient can go about his normal work without the handicap of drowsiness but with his seizures reduced or abolished. The mechanism of this action is unknown. Due to drug idiosyncrasy some epileptics are unable to tolerate dilantin.

In general, the bromides, like the barbiturates, are depressants of the central nervous system and psychological functions. Dilantin is an especially desirable drug to use in the treatment of epilepsy since it does not slow down the individual's psychological functions as severely as does phenobarbital.

OPIUM DERIVATIVES

Opium is obtained from the seed of a poppy, the natural habitat of which is Asia Minor. Morphine makes up about 10 per cent of opium, and codeine 0.5 per cent. Heroin is a synthetic morphine derivative, and its importation or manufacture into the United States is prohibited by law although it is four to eight times as potent as morphine in relieving pain. Its danger lies in the ease with which addiction occurs due to the intense elation produced by its use and by the absence of unpleasant vomiting and constipation. The narcotics used illegally in the United States are chiefly heroin, morphine, and cocaine, in the order named.

Addiction to opium is much more common in some of the other countries than in the United States. However, the part played by opium in producing drug psychoses may be seen from the report of Moore and Gray.² Of 841 hospitalized mental cases diagnosed as "with psychoses due to drugs and other exogenous toxins" (exclusive of alcohol) 43.2 per cent involved opium derivatives, 24.7 per cent barbiturates and 12 per cent bromides.

The cause of addiction is unknown, but as before mentioned tolerance is an intimately connected factor. Withdrawal symptoms

¹ Merritt, H. H., and Putman, T. J., A New Series of Anti-convulsant Drugs Tested by Experiments on Animals, *Arch. Neurol. Psychiat.*, 1938, **39**, 1003-1015.

² Moore, R. A. F., and Gray, M. G., Drug and Mental Diseases: A Review of 841 Cases, *Confin. Neurol.*, 1942, **41**, 238-270.

appear as soon as the drug is removed. In some persons a few doses are followed by withdrawal symptoms; in others, several days to 2 weeks of dosage are required. In addition, the euphoria at first experienced soon wears off in the case of morphine so that the dose must be continuously increased. Some use the drug for the euphoria obtained, but some do so only to escape the intolerable withdrawal symptoms.

Morphine.—This drug is typical of the opium group. Morphine acts chiefly on the central nervous system causing both depressant and stimulant effects. The drug exerts a narcotic action by causing analgesia (absence of pain) and producing sleep. When moderate amounts are taken, the result is euphoric, pleasant drowsiness, freedom from anxiety, relaxation, flow of uncontrolled thought and imagination, telescoping of the time sense, disappearance of inhibitions. Concentration is poor, there is difficulty in thinking, decrease in physical activity, dimming of vision, and lethargy. The psychological effects outlast the analgesic action by many hours according to Wolff,¹ and his coworkers.

Within 4 to 12 hours after removal of morphine, withdrawal symptoms occur. They decline by the fifth day and may cease in from 5 days to 2 weeks. Abstinence symptoms are always unpleasant and include vomiting, restlessness, inability to sleep, loss of appetite, tremor, and other effects. If withdrawal is sudden, death may occur.

The popular concept of the morphine addict as a sly, degenerate criminal who is slovenly and ill is not typically true. Frequently he appears just like anyone else unless the drug is removed. Coleridge used opium, as did many a famous person. Brilliant work is thus not incompatible with opium addiction, although drug addicts as a group show a decline in mental efficiency as shown by the work of Partington.² He found a lowered efficiency index on the Babcock scale, which measures the efficiency of mental functioning.

COCAINE

Cocaine is obtained from the leaves of a plant growing in Peru and Bolivia, where its leaves have been chewed by natives to increase endurance. This drug can block nerve conduction upon local application and is used as a local anesthetic. Its most striking effect is

¹ Wolff, H. G., Hardy, J. D., and Goodell, H., Studies on Pair Measurement of the Effect of Morphine, Codeine, and Other Opiates on the Pain Threshold and on Analysis of Their Relation to the Pain Experience, *J. Clin. Invest.*, 1940, **19**, 659-680.

² Partington, J. E., The Comparative Mental Efficiency of a Drug Addict Group, *J. Appl. Psychol.*, 1940 **24**, 48-57.

stimulation of the central nervous system, beginning first with the cortex. Certain individuals indulge in the drug to obtain this effect, although it is not used for this purpose clinically because it is much too toxic.

When the cortex is affected, the first symptoms are talkativeness, restlessness, and excitement. Pleasurable hallucinations and euphoria may occur. Motor activity increases, and there is a feeling of strength. The cocaine addict is often a dangerous person. Delusions of a persecutory nature occur, with jealousy and ideas of infidelity, so that the addict may carry a weapon out of false beliefs of danger to himself and threat to his property. Auditory, visual, and tactual hallucinations of insects crawling on the skin may occur (cocaine bug). Abstinence symptoms are not severe so that, unlike the morphine addict, the cocaine addict continues using the drug for its stimulating effect.

Although not used as much as some of the other drugs, cocaine is one of the most degenerating.

MARIJUANA (ALSO KNOWN AS CANNIBIS, HASHISH, AND BHANG)

Marijuana is obtained from the flowering top of the hemp plant. This drug presents a problem in many parts of the world, including the United States, where the plant thrives. Preparations of it are chewed, smoked, and drunk. In the United States the commonest method of use is to smoke it in cigarettes known as "reefers," sold illicitly. The main effects are on the central nervous system where both excitation and depression of functioning occur. Depression manifests itself in loss of feeling in the skin with blunting of pain and touch.

The effects vary, but the most common are elation, a dreamy state in which ideas are disconnected and illogical. Vivid visual hallucinations occur and these may have a sexual coloring. Behavior is impulsive. Delirium and mania may occur with resulting acts of violence. The psychological effects persist as long as 24 hours following a sleep-producing dose. Studies agree that the effects of marijuana are decidedly unfavorable to mental and motor efficiency. This drug is used only outside the practice of medicine; it has no value in the treatment of illness.

ALCOHOL

The basis of the thirst for alcohol is not a physiological need arising from tissue dryness such as occurs when there is a desire for water. Alcoholism is a psychological rather than a physiological habit. Many individuals crave alcohol not because their bodies demand it

but because it permits them to escape from the realities of life. The claim, however, that alcoholism rests primarily on a neurotic or psychotic basis is a very questionable one. When there is strong group disapproval of the drinking of alcoholic beverages, alcoholism is rare, regardless of the incidence of neurosis and psychosis in the group.

It is probable that many United States citizens drink because drinking has become a widespread social custom. Moros¹ made a study of 748 World War veterans who were of draft age in 1917-1918 and found that alcoholism was most prevalent among the Irish and Americans and rare in the Italian and Jewish groups. In the first two groups drinking, especially among the men, is far from socially condemned, while the Jewish people have set up a powerful social tradition against it. Drinkers in general find that alcohol provides a tempting uplift, a feeling of release from social and personal inhibitions, and a dulling of worries and cares. Since it is well known that the behavior of any normal man can be altered beyond his control by the ingestion of alcohol and that its continued or immoderate use may cause serious bodily damage, the solution for those who wish to indulge seems to be to keep the quantity consumed within the limits of their individual ability to cope with it.

However, with alcohol as with many pleasure-giving substances, it is not easy to take it or leave it. Many do take it. The number of people who drink alcoholic beverages in the United States has been estimated to be about 40,000,000.² Of these 40,000,000 who take it, 600,000 cannot leave it. They have become chronic alcoholics.

PHYSIOLOGICAL BACKGROUND OF ALCOHOL EFFECTS

Absorption.—Alcohol is freely absorbed into the blood stream not only through the gastrointestinal tract but also through the lungs by inhalation. In fact the absorption of alcohol by inhaling may result in intoxication and even death. It is quickly absorbed when injected under the skin. It is also absorbed from the colon, bladder, and rectum, so that severe intoxication may occur through use of alcoholic solutions in enemas.

Alcohol's most common avenue of entrance into the body, however, is by way of the mouth. Absorption into the blood stream begins at once although the amount absorbed through the mucous membranes of the mouth and throat is slight. The liquor passes on into the stomach

¹ Moros, V., *The Alcoholic Personality: A Statistical Study*, *Quart. J. Stud. Alcohol*, 1943, 4, 45-49.

² Haggard, H. W., and Jellenek, G.M., *Alcohol Explored*, Doubleday, Doran & Company, Inc., New York.

where as much as one-fifth of it may be absorbed.¹ The remainder passes through the blood-vessel walls of the intestinal tract.

The rate of absorption depends upon several factors; and as the degree to which the drinker is affected depends upon the concentration of alcohol in the blood stream, these factors are important.

It is commonly known that the physiological and psychological effects of alcohol are greater when it is taken on an empty stomach. The intestinal contents, then, determine to some degree the rate of absorption and, hence, the effects of the liquor. Although any food or liquid will bring about this effect to some extent, certain foods delay absorption more than others. This is particularly true of the fatty substances found in butter, cream, olive oil, and milk. Consequently, two cocktails before dinner are as potent as four after dinner.

Habituation is apparently a factor also, as it has been shown that intoxication by a specific dose is greater in the person unaccustomed to drinking than in the habitual drinker. The exact mechanism of this acquired tolerance to alcohol is not known.

A third factor in determining the rate of absorption of alcoholic beverages into the blood stream is the concentration of the ingested solution. The greater the concentration of alcohol in the liquor, the faster is the onset of intoxication. Whiskey and brandy, being concentrated forms of alcohol, will lead to intoxication more readily than dilute forms such as beer or wine.²

Other factors such as body weight, rate of alcoholic consumption, and possibly the rate at which it is oxidized, may also effect the concentration of alcohol in the blood stream.

In considering aftereffects of alcohol we may conclude that the important factor is the concentration in the blood, although psychological factors may also enter in. If an individual believes he is about to become intoxicated, he probably will react accordingly. Consequently, in experiments designed to measure aftereffects, if the subject knows that he is consuming an alcoholic beverage, a nonalcoholic dose, which the subject is led to believe is alcohol, is also administered. By comparing the results obtained from the alcoholic dose with the results obtained from the nonalcoholic dose, the portion of the results attributable to the subject's belief that he would be affected can be determined. The final conclusions as to actual effects can then be made.

¹ Department of Education Bulletin, 13, July 1, 1935, p. 10.

² Newman and Abramson offer a further explanation of the slow absorption of wine by stating that wine has been found to contain a buffer substance that tends to slow down absorption. When whiskey was buffered to an equal degree, it absorbed as slowly as wine. Newman, H. and Abramson, M., Why Wine Acts Slower than Whiskey, *Science Digest*, 1944, 12, 58.

Distribution.—A few minutes after alcohol has been swallowed it appears in the blood stream, unchanged by its passage through the digestive tract, and its distribution throughout the body begins. It passes through body veins into the liver and eventually into the heart, lungs, and arteries, and is distributed to all parts of the body.

Once alcohol has entered the blood stream, all of the organs of the body will, in consequence, be reached by blood containing alcohol. Thus alcohol may affect the functioning of any organ or tissue in the body. It does not affect all organs and tissues equally, however. Particularly prone to its action are the tissues of the central nervous system and especially those of the brain where concentration will eventually be the highest. The brain of an individual suffering from alcoholic intoxication gives off a faint aroma of alcohol when the skull is opened. That the brain itself is disturbed in its functioning is attested by the fact that Engel and Rosenbaum¹ found a slowing down of all countable frequencies in all instances in the brain waves of four alcoholics and seven normals in whom alcoholism was induced experimentally so that electroencephalographic changes associated with acute alcoholic intoxication could be studied.

According to medical authorities² a concentration of 1 mg. alcohol per 100 cc. blood is generally unaccompanied by symptoms. Exhilaration appears when the concentration is from 1 to 3 mg., depression and ataxia with 4 to 5 mg. Higher concentrations result in coma. At 7 mg. death usually occurs. In terms of alcohol consumed, a pint of whiskey, undiluted, and taken in a short period of time may induce death in most adults. Even smaller amounts may cause death in some cases and as little as several tablespoons of alcohol have killed young children. Alcohol is a potent poison.

Figure 34 shows the approximate concentration of alcohol in the blood and urine as related to various stages of intoxication. While alcohol can be detected in the blood stream within a few minutes after a dose is swallowed, its greatest concentration in the blood occurs between half an hour to 2 hours after it is taken.

Elimination.—The amount of alcohol eliminated depends on the amount consumed, but as high as 10 per cent may be excreted in the urine, sweat, and other secretions. Elimination occurs also by exhaling, and the concentration of alcohol in both the breath and the urine roughly parallels that of the blood. Determining the concen-

¹ Engel, G. E., and Rosenbaum, M., *Delirium*, *Arch. Neurol. Psychiat.*, 1945, **53**, 44–50.

² Cecil, R. L. (Ed.) *Textbook of Medicine*, p. 595, W. B. Saunders Company, Philadelphia, 1941.

tration of alcohol in the urine, as a means of investigating the concentration of alcohol in the blood, is not an accurate method since the contents of the bladder at a given moment may represent an accumulation of concentrations. Consequently, the concentration of alcohol in the breath is a better index. However, it is difficult to state a concentration at which drunkenness occurs, since people differ in susceptibility to alcoholic effects. Some states have adopted $1\frac{1}{2}$ mg. per 100 cc. blood as the critical concentration in judging a driver to be intoxicated.

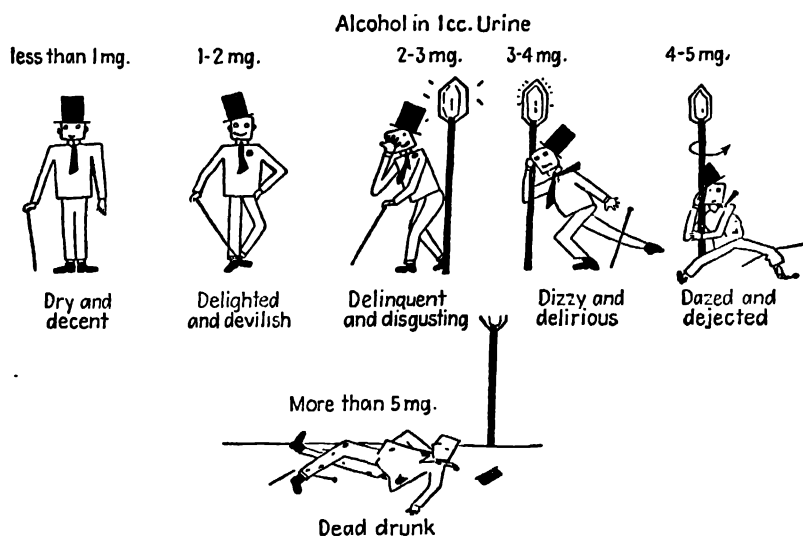


FIG. 34.—Concentration of alcohol in blood at various stages of intoxication.

Alcohol is largely eliminated, however, by oxidation. It is oxidized rapidly to carbon dioxide and water, although oxidation does not keep up with absorption. The upper limit of the amount of alcohol that can be used in one hour appears to be 10 g., hence as a food and source of energy its use is limited although it has a caloric value of 7 calories per gram. In view of the fact that alcoholic beverages are rich in calories but poor in vitamins and other necessary food substances, nutritional deficiencies may develop. Of great importance is vitamin B₁ deficiency. Although small amounts of alcohol may stimulate the appetite, large amounts taken over a long period of time result in a vitamin B₁ supply that is too low for the caloric intake. There is also a loss of appetite for other food that might, to some extent, supply the vitamins. Proper feeding with concentrated foods and vitamin concentrates has become a useful part of the treatment of

such alcoholic disorders as delirium tremens, Korsakoff's psychosis, and alcoholic neuritis.

Dr. Norman Jolliffe¹ explains the ability of our grandfathers of 100 years ago to drink a quart of whiskey a day without developing alcoholic diseases to be due to their superior intake of vitamin B₁. The diet of the present day is too lacking in the vitamin to restore the proper vitamin B₁-calorie ratio.

EFFECTS OF ALCOHOL

Alcohol is an irregularly descending depressant of the central nervous system. In sufficient quantities it is an anesthetic that, although lasting longer than ether, is not employed by the medical profession for that purpose because the margin between the anesthetic and the fatal dose is slim. Alcoholic coma, in other words, is a dangerous state. As an anesthetic, alcohol occupies a place between the general anesthetics and the hypnotics. It is sometimes used by the layman as a pain killer and a hypnotic, but its use for those purposes is not generally recommended by the medical profession.

The question as to whether or not alcohol is a stimulant or depressant has long been debated. A great many carefully performed experiments have piled up evidence pointing to the reduction of all psychological functions yet measured.

The layman in particular views alcoholic drinks as stimulating. His belief arises from several sources. First, an illusory feeling of stimulation arises from the removal of the inhibitory effect of the higher centers, so that the activity of the lower centers is unrestrained and the individual feels released, excited, and exhilarated. As a result he may become unruly and boisterous, with little feeling of responsibility for the social consequences of his behavior. Second, a feeling of warmth occurs. By reducing vascular tension alcohol causes the blood vessels at the body's surface to dilate so that they become engorged with blood and an illusory glow occurs. But radiation of heat from blood, now exposed at the surface, actually lowers body temperature. It is unwise to drink alcoholic beverages during exposure to extreme cold. When actual measurements are carried out in this period of illusory stimulation, general efficiency of psychological functions is found to be reduced.

Effect on Sensory Functions.—Alcohol depresses the sense areas of the brain so that impulses from the sensory end organs are received

¹ Jolliffe, Norman, 1840 Americans Could Drink Quart of Whiskey a Day, *Science News Letter*, 1940, 37, p. 408.

more faintly or not at all according to the amount consumed. In the skin, the sensations of pain, heat, cold, and touch are affected.

In an experiment in which large body areas were exposed to heat, Hardy, Wolff, and Goodell¹ found that alcohol works within 15 minutes to relieve pain as compared with much longer times taken by other drugs. Rating intolerable pain as 100 per cent, these scientists reported aspirin's effectiveness as 35 per cent while alcohol's was 40 per cent. They also report that there is no summation of pain when the body is exposed to heat, such as occurs with touch, sight, heat, and cold, so that pain over a large area is no greater than pain over a small area. Thus alcohol reduces the ability of the body to respond with alarm reaction when large areas are exposed to heat. Medically prescribed, alcohol may be a useful sedative to give relief from pain; in other instances it may lead to serious injury because it deadens pain.

In very large doses complete loss of pain and other sensory functions occur, the condition being similar to that produced by ether. However, alcohol ingested in quantities large enough to accomplish this anesthetic effect is dangerous and is not used medically for that purpose. Nor is it recommended for shock or snake bite by the medical profession, contrary to lay belief, as it does no good in either case and probably lessens the individual's chances of recovery.

The effects of alcohol on the sense of touch was studied by Dodge and Benedict.² Eight students served as subjects, each of whom was given 30 cc. absolute alcohol in 20 per cent dilution. An induction coil was used to produce electric shock and the amount of electrical energy required to produce a just perceptible shock in the tips of the first and second fingers when they were dipped in liquid electrode was ascertained. In the 1½- to 2-hour period following dosage, all but one of the subjects required a 12 to 48 per cent average increase in the strength of the stimulus in order to produce the shock sensation. The eighth man showed an 11 per cent decrease in the strength of the stimulus required to produce the shock sensation, thus once again calling attention to individual differences in reaction to drugs. We may conclude, however, that for the average individual, skin sensations are reduced by alcohol.

On visual and auditory sensation, investigators are in agreement

¹ Hardy, J. D., Wolff, H. G., and Goodell, H., Alcohol Quicker Pain Killer Than Any Other Drug, even Morphine. *Science News Letter*, 1939, **35**, p. 293; Alcohol Reduces Ability of Body to React, *Science News Letter*, 1941, **40**, p. 217.

² Dodge, R., and Benedict, F. G., Psychological Effects of Alcohol, *Carnegie Instn. Publ.* No. 232, 1916.

as to the depressant effect of alcohol. Even in moderate doses, there is less ability to discriminate between near and far objects and soft and loud sounds. Thus the usual warning of danger close at hand by visual and auditory cues is reduced. Some investigators find that the sensitivity of the ear and the eye to slight stimulation is somewhat improved by small doses, even though discrimination declines. Specht¹ obtained such a result in his study of the absolute auditory threshold after the consumption of alcohol. Men who were accustomed to moderate drinking and who were between twenty and forty years old were used as subjects. Tests were made on 12 nonalcohol days and on 4 alcohol days. The effects of dosages of 40, 20, and 10 cc. absolute alcohol in approximately 20 per cent dilution were studied. Although the ability to hear faint sounds increased slightly on alcohol days, the ability to discriminate whether one sound was louder than the other was reduced.

In his carefully controlled study, Hansen² confirms Specht's results with respect to difference thresholds but not for absolute thresholds. Stronger tones were required in order to be recognizable as well as larger intensity differences between tones, after alcohol ingestion. In this study the dosage of each subject was adjusted to his body weight and the subjects were carefully trained in detection of auditory stimulation. The equipment that provided the sound stimuli was adequate for the purpose and well controlled.

It is not surprising that we find discrepancies in experimental results in dealing with absolute sensory thresholds, since their determination depends largely upon practice as well as upon adequate control of the stimulus used. Both of the above studies are useful, especially in pointing the way to future research; and both point to reduction of the efficiency of the auditory mechanism. We obtain further evidence of this reduction from observation of the intoxicated individual. He talks in a loud voice but is unaware that he is doing so and may become combative and indignant if reprimanded. He raises his voice because he can no longer hear himself when using his usual strength of delivery.

Specht, in collaboration with Lange,³ made a second study of alcoholic effects, this time upon vision, and found the subjects able to see a slightly dimmer light but less able to match rotated gray discs.

¹ Specht, W., *Die Beeinflussung der Sinnesfunktionen durch geringe, Alkoholgaben*. *Arch. ges. Psychol.*, 1907, 9, 180-295, as quoted by Walter R. Miles in *Alcohol and Man* by Haven Emerson, pp. 224-245, The Macmillan Company, New York, 1939.

² Hansen, K., as quoted by Miles, *ibid.*, p. 245.

³ Lange, J., and Specht, W., as quoted by Miles, *ibid.*, p. 245.

A further effect of alcohol upon vision has been discovered in studies on the effect of vitamin A on the body (see Nutrition). Clausen¹ and his associates discovered that alcohol increases the amount of vitamin A in the blood. Pett² discovered the same effect. The conclusion was drawn that alcohol apparently causes a shift of the vitamin from its storage place in certain tissues to the blood, so that it is distributed to other parts of the body, including the eye, where it is needed for night vision. This shift is thought to account for Pett's discovery that his subjects showed an unaccountably short recovery time in dark adaption the day following ingestion of alcohol.

From his clinical study of alcoholics, Ligo³ reports that, vision is slightly affected so the patient may complain of shadows or mist before the eyes and objects become dimmer. Gradually, central vision is affected and he finds it difficult to perform his usual work. The shadows may assume the character of transitory central scotoma (central blindness). This effect is found in cases of alcoholic neuritis occurring behind the eyeball and may form the basis of visual hallucination seen in delirium tremens.

Effects on Motor Functions and Coordination.—The motor functions of the intoxicated individual are affected even more noticeably than are his sensory functions; in fact, this change furnishes the chief clue to the observer who is familiar with the classical picture of the drunken man. He walks with a staggering gait, leans against a lamp-post in order not to fall, vainly attempts to insert his key in the lock, and talks with thickened speech. Delicate measuring devices will detect his difficulties before they are observed by his associates. Miles⁴ measured sway, using a delicate device called the ataxiometer. Six medical students were given 27.5 g. diluted alcohol, and a control dose of water of the same temperature was administered on non-alcoholic days. All of the subjects swayed more following the alcohol than after the control dose. At 15, 45, 75, and 105 minutes after alcohol, the increase in sway amounted to 12, 38, 24, and 8 per cent respectively.

On finer motor movements, Miles⁵ reports the results of 44 tests

¹ Clausen, H. J., Night Vision Sharpened by Drink on Previous Day, *Science News Letter*, Aug. 3, 1940, p. 69.

² Pett, L. B., as quoted in *Science News Letter*, Aug. 3, 1940, p. 69.

³ Ligo, Parua, J., Toxic Effects of Alcohol on Vision, *Rev. Oto-Neuro Oftal.*, 1940, 15, 10.

⁴ Miles, W. R., Alcohol and Human Efficiency, *Carnegie Instn. Publ.*, No. 333, 1924.

⁵ Miles, *ibid.*

on 5 trained male typists, all moderate alcohol users. Half of the experiments were conducted with alcohol (21 to 41 g. in 22 per cent solution without food), and half without alcohol. Three types of copy material were always presented, 20 lines of practice copy, 25 lines of scientific prose, and 10 lines of nonsense material. Each experiment lasted 4 hours after the alcoholic or nonalcoholic dose. Preliminary trials were given. Errors in typing all grades of copy were increased about 40 per cent in the first 2 hours after taking the smaller dose and 70 per cent in the first 2 hours after taking the larger dose. Speed of writing was decreased by only 3 per cent. Other investigators also have found a greater decrease in accuracy as compared with speed of motor execution.

The thick, faulty speech of the inebriated person is a well-known symptom. Hollingworth¹ tested control of the speech mechanism using the Woodworth-Wells Color Naming Test. This test consists of 100 small squares of five different colors occurring in random order on a sheet of paper. The subjects were required to name the colors as they occur. Each time a subject made a mistake the experimenter said, "No," whereupon the subject had to give the correct color before proceeding, thus adding to the time score. Six young men served as subjects. Each was given a commercial beer of low alcoholic content. The control beverage was the same beer but with the alcohol extracted. Three subjects showed disturbance of speech on small dosage and great disturbance on large dosage. The other three showed no significant disturbance.

Whether motor functions are affected for a short or longer time has been a matter of speculation. It has been argued by some that alcohol taken as a nightcap relaxes the individual and improves sleep, so that he is better able to function the next day. Miles² reported the investigation of Emerson and Carpenter on the effect of night doses of alcohol. An adult male subject was given a rectal injection of 47 cc. alcohol in 500 cc. total fluid during sleep. Control doses of saline solution were used. Psychological measurements of motor functions were made the night before and the morning after each dose. The morning measurement showed a 4 per cent decrease in speed of voluntary motor functions after alcohol night injections.

Effects on Intellectual Functioning.—Experimental studies are in agreement that alcohol causes a disturbance of intellectual functioning that lingers while the alcohol is in the body. Continuous immoderate

¹ Hollingworth, H. L., *The Influence of Alcohol*, *J. Abnorm. Soc. Psychol.*, 1923-1924, 18, 204-237, 311-333.

² Miles, *op. cit.*

usage may result in lasting impairment. In an experimental study Hollingworth¹ found an appreciable decrease in the scores on an intelligence test involving logical relations, resulting from ingestion of 2.75 per cent beer, an admittedly dilute drink as compared to most alcoholic beverages. Further, scores declined to an even greater degree when dosage was increased. Wechsler² tested 29 nonpsychotic, chronic alcoholics with at least a 10-year history of continued drinking but showing no organic brain complications as far as could be observed. When tested on the Wechsler-Bellevue scale however, analysis of subtests revealed that impairment of mental functioning of various abilities had occurred, even before there were any manifestations of brain pathology.

General Effects.—Of major interest is the question of the effect of alcohol on life span. Investigators are fairly well agreed that the moderate use of alcohol does not shorten life but that immoderate use does. Pearl³ obtained the family history of 5,000 persons, the records extending from three to five generations, and concluded that moderate drinking does not significantly shorten life when compared to total abstention, while drinking heavily does seriously diminish life span. These results are shown in Fig. 35.

In drawing conclusions from such studies one must keep in mind the possibility that longevity may have been determined by some other factor common to the users or nonusers, along with alcohol. In fact, Pearl himself, in his study on longevity, comments that in his group of long-lived individuals, some were abstainers and some were heavy drinkers. The one trait they had in common was a placid temperament. He concludes that the length of life is in inverse proportion to the rate of living.

After a careful study made at the direction of the General Assembly of Virginia in 1936 Wadell and Haag⁴ concluded that the temperate use of alcohol does not shorten the life span, probably plays no important part in the perpetration of lawlessness, helps digestion, gives drinkers a lift, and produces a feeling of self-satisfaction and well-being. The chief difficulty with temperate drinking is that it may lead to intemperate drinking with all its mental, moral, physical, and social ills.

¹ Hollingworth, *op. cit.*

² Wechsler, D., The Effect of Alcohol on Mental Activity, *Quart. J. Stud. Alcohol*, 1941, 2, 479-485.

³ Pearl, Raymond, The Search for Longevity, *Sci. Mon.*, 1938, 46, pp. 462-483.

⁴ Wadell, J. A., and Haag, H. B., *Alcohol in Moderation and Excess*, The William Byrd Press, Inc., Richmond, 1940.

As a causal factor in accidents, however, particularly automobile accidents, even a small amount, because of its quick depression of the functions of the central nervous system, may become directly responsible for a tragedy. As we have noted, the senses of hearing, vision, and position become inaccurate. In addition, removal of higher inhibitions results in a diminishing of a feeling of responsibility

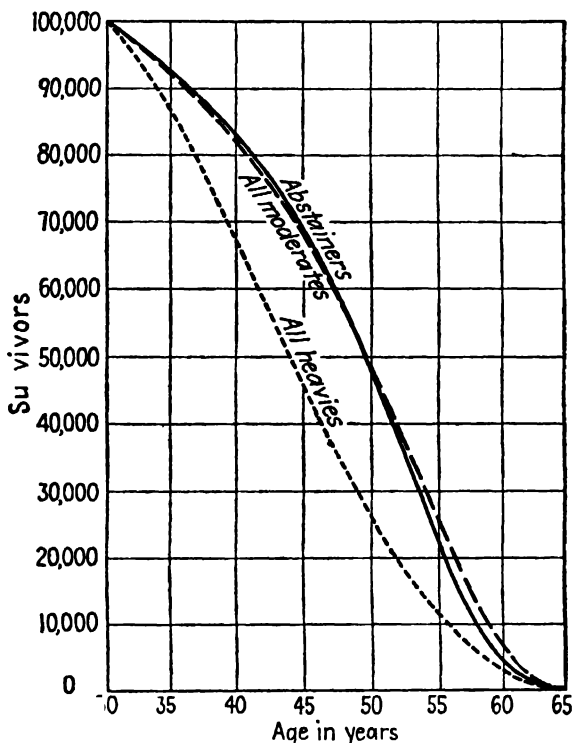


FIG. 35.—The number of surviving males out of 100,000 starting together at age thirty, in three drinking categories: a. Abstainers (solid line). b. Moderate drinkers (dash line). c. Heavy drinkers (dotted line). (From Raymond Pearl's *The Search for Longevity*. Courtesy of *Scientific Monthly*, May, 1938, p. 478.)

for behavior or consequence. From 7 to 10 per cent of all fatal accidents are attributed to alcohol.

Various physical phenomena accompany even small dosages of alcohol. We shall mention two of these briefly since they give rise to misconceptions of alcohol effects. The drinker develops a dry mouth. This is due to the fact that alcohol has the property of attracting water from any medium with which it comes in contact. It can even remove moisture from the air and so dilute itself. In the body, it removes water from the tissues and so gives rise to abnormal tissue dryness

and need for water. A second effect is an increase of appetite, as a result of small doses of alcohol. This is due to the irritant effect upon the stomach wall giving rise to sensations of hunger.

Wadell and Haag¹ agree with other investigators that abuse of alcohol, i.e., its continuous or immoderate use, presents a serious picture, shortening life span, contributing to lawlessness and all kinds of ills. - Approximately 10 per cent of the mental diseases that we find in our hospitals are due to the use of alcohol. This figure does not include mere drunkenness (acute alcoholic intoxication) or alcoholic conditions of a temporary nature for which individuals are often hospitalized. In their study of drugs, Moore and Gray² found that the annual rate of admission for alcoholic psychosis in the Boston Psychopathic Hospital between 1920 and 1932 was eight times as great for alcohol as for other drug psychoses combined. In addition to the 600,000 chronic alcoholics already mentioned, it is estimated that there are 2,000,000 more individuals who are potential alcoholics. Over these intemperate users hangs the threat of the alcoholic disorders.

THE ALCOHOLIC DISORDERS

Important in the consideration of alcoholic disorders is the fact that heavy drinkers receive from 3,000 to 4,000 calories per day from alcohol alone. We may recall that earlier in our discussion it was mentioned that alcohol is poor in vitamins. Foods rich in vitamins are displaced by alcohol. Reduction of the amount of vitamin B upsets the important caloric-vitamin B ratio. In addition, loss of vitamin B results in loss of appetite for other foods so that general diet is neglected. Still further, although the irritant effect of small doses of alcohol may increase appetite, large doses inflame the mucous membranes of the stomach and cause food to be lost or avoided. We can now easily understand why alcoholic addicts may develop pellagra, a nutritional disorder that, if untreated, may result in insanity. This disease and its symptoms have already been discussed under nutrition.

Alcoholism is of two sorts, acute and chronic.

Acute alcoholism, or acute alcoholic intoxication, occurs when the drinker has consumed alcohol in large enough quantities on a drinking spree to poison the central nervous system and so disorder his faculties, rendering him unable to execute ordinary functions. He passes through the stage of uplift, on to excitement, euphoria,

¹ Wadell and Haag, *ibid.*

² Moore, M., and Gray, M. G., *Drugs as a Factor in Production of Mental Diseases*, *J. Crim. Psychopath.*, 1941, 2, 271-295.

and possibly mania. Incoordination, ataxia, and perhaps coma develop, depending upon the amount of alcohol consumed. The word intoxication means "a poisoning," and this familiar picture can hardly be called a mental disease or psychosis since rationality returns as soon as the drinker rids himself of the alcohol. However, alcoholic intoxication may bring to the surface underlying psychic conflicts and abnormalities. The individual loses his social judgment and is frequently picked up by the police for disorderly conduct. In fact, alcoholic intoxication constitutes from a third to a half of all arrests made in some states.

Acute alcoholic intoxication without coma usually disappears spontaneously, leaving a severe postalcoholic headache, lassitude, and dehydration. Patients with coma present a more serious picture, as they are highly susceptible to pneumonia or even death. A special form of acute alcoholism constitutes a psychological disorder. The individual has an uncontrollable urge to go on periodic drinking sprees although he is contrite between attacks and may even attempt suicide in a period of depression over his behavior. He is called a *dipsomaniac*, and his disorder is *dipsomania*, a nonpsychotic compulsion. He meets the criteria of both acute and chronic alcoholism.

Chronic alcoholism refers to alcoholic addiction in which the individual indulges in continuous moderate or immoderate use of alcoholic beverages, or in periodic, irregular bouts of alcoholic intoxication.

Alcoholic addiction constitutes a problem of psychiatry. No one has yet adequately explained the basis of the disorder although there is some agreement that an immature personality is probably involved. The immediate cause of chronic alcoholism is, however, previous experience with acute intoxication. An urge apparently develops to repeat the experience.

The principal damage from the chronic use of alcohol is to the nervous system. The exact mechanism of this damage is not definitely known. The increase of fatty substances and the nutritional deficiencies that occur are thought to be factors. Vitamin C deficiency may predispose the drinker to damaging subdural hemorrhage. The role of vitamin B has been discussed. Eventually, intellectual processes may become dull; judgment is impaired, and nervous symptoms are common, as are signs of emotional disturbance. There may be a progressive loss of muscular power. Superimposed on this background of addiction, other complications may eventually occur, such as pellagra, delirium tremens, wet brain, acute or chronic hallucinosis, neuritis, Korsakow's psychosis, and alcoholic deterioration. For discussion of the alcoholic mental disorders see Chap. VIII.

TREATMENT

Treatment of specific alcoholic disorders by balanced diet and vitamin therapy, especially vitamins B and C, has already been mentioned. Benzedrine sulfate likewise, according to Reifenstein and Davidoff,¹ may relieve symptoms of depression, acute alcoholic psychoses, and some symptoms of Korsakow's psychosis, as well as the boisterousness of acute alcoholic intoxication and hangover symptoms. None of these treatments cures chronic alcoholism. They bail the boat but they do not stop the leak. The problem actually involved is how to cure the chronic alcoholic of his alcoholism. If alcohol is a habit-forming drug, it is evidently so for only a small part of the drinking population. The question then becomes—what is wrong in the personality or constitution of the addict?

There have been many attacks upon the problem. Religious exhortation, legislation, hydration, spinal fluid drainage, psychoanalyses, psychotherapy, shock therapy, Alcoholics Anonymous, drugs, rest and food therapy, the Yale Clinic, all have been employed in the attempt. We shall discuss a few of these. The psychiatrist has been of help in some cases, especially where he has been able to establish rapport with the patient and lead him to wish to be cured.

The conditioned reflex treatment has been found fairly successful. This treatment grows out of the Russian psychologist Pavlov's experiments in conditioning dogs. The patient must spend at least several nights or week ends in a hospital or other protective environment. Here an emetic is injected subcutaneously and the patient is then given alcoholic drinks which promptly nauseate him so that he vomits. This is repeated until he has a marked aversion for alcohol.² Reinforcement technique is used to fix conditioned response, which may otherwise die out; that is, the treatment is repeated at 30-, 60- and 90-day intervals. The patient's attitude and cooperation are crucial. Psychiatrists, Alcoholics Anonymous, and various clinics are often helpful in securing the patient's cooperation in this cure.

The question arises as to why ordinary heavy drinking with its nausea does not effect a cure. By the time the drinker is nauseated, he is also narcotized so that he does not care and only faintly remembers the experiences, if at all. In the conditioned nausea described above,

¹ Reifenstein, E. C., and Davidoff, E., as quoted in *Sci. Am.*, 1940, **162**, 286.

² That the treatment is effective is attested to by Dr. Albert Crane who tells of one doctor who attended a cocktail party shortly after giving the conditioned reflex treatment to a patient. When the Martini's were presented, the doctor promptly vomited. *Bull. of Res. Council on Prob. of Alcohol*, 1944, **1**, 4.

the affect is immediate and narcosis does not appear. In a follow-up study of 1,042 cases Voegtlen¹ and his associates found 58.6 per cent still abstinent after 5½ years. (The reinforcement technique developed later.)

A helpful supplement to medical treatment is the Fellowship of Alcoholics Anonymous." This organization is made up of groups of alcoholics, some cured, some still struggling for cure. Their program consists of weekly meetings in which the members talk over their difficulties. This activity has the value of mental catharsis and makes the alcoholic feel less isolated by his trouble. Members visit prospective members and members who have slipped into alcoholism. These visitors help the individual to accept hospitalization and treatment. This second activity has a double benefit. The one-time alcoholic sees the unhappy plight of the sick alcoholic and this time narcosis does not protect him from full realization of the resulting degradation; also the alcoholic is more apt to accept advice from a fellow addict than from someone who does not understand his plight as a result of personal experience.

In the spring of 1944, the Yale Plan Clinics started functioning in New Haven and Hartford. Local courts, relatives, employers, families of alcoholics, and the alcoholic himself may refer cases to this center where an all-around study is made of the individual's problem. The alcoholic is then sent to whatever treatment best suits his total needs.

Workers in this field rarely claim a cure. They only hope to persuade the chronic alcoholic, by one means or another, to drink water instead of alcohol. The problem of addiction is unsolved.

TOBACCO

The drug nicotine is derived from tobacco leaves. It has no uses in medical treatment, but, due to its high toxicity and the fact that it is widely used in smoking, it has been studied intensively. The drug acts upon both the autonomic ganglia and the central nervous system, first stimulating, then paralyzing, nerve cells. By acting upon several sites, and by having both a stimulating and depressing phase of action, nicotine produces complex and often unpredictable changes in the body. The final response is the summation of the effects.

Nicotine is one of the most poisonous of all drugs and acts with a rapidity comparable with cyanide. Death occurs as a result of paraly-

¹ Voegtlen, W. L., Lemerc, F., Broz, W. R., and Holloren, P., Conditioned Reflex Therapy of Alcoholic Addiction: Follow-up Report of 1,042 Cases. *Amer. J. Med. Sci.*, 1942, **203**, 525-528.

sis of the muscles of respiration. Although a cigar probably contains more than a lethal dose of nicotine, only a portion of the drug gains access to the respiratory tract in smoking. This portion varies from person to person depending on habits of smoking, such as the practice of inhalation.

The problems relative to the psychological effects of tobacco smoking are many and varied. These include the effects on the habitual smokers and the nonsmokers; individual differences in ability to acquire tolerance; the effects of different kinds of smoking, cigar, cigarette and pipe; the comparative effect on the two sexes; the question of the effect of other substances involved in the burning process besides nicotine; the effects upon mental and physical function in normal situations and in such abnormal situations as war; and the effects of bias and suggestion.

Due to the complexity of the entire problem many studies have differed greatly in both the degree and the manner by which they attempted to control variables, with resulting disagreement on findings.

One of the best controlled studies yet conducted was that of a committee formed for the study of the tobacco problem and working under the guidance of Clark Hull.¹ The effects of tobacco smoked in a pipe were thoroughly investigated. He devised a control pipe that was identical with the tobacco pipe except that it was electrically heated and contained no tobacco. The subjects were told that the effects of tobacco smoking were being studied and as they were blindfolded for the smoking sessions they did not know that on certain days they were drawing on a pipe that was fed only warm, moist air. The experimenter smoked tobacco during the control periods in order to complete the illusion by furnishing the necessary odor. In addition, the blindfolded subject could hear the sound of the pipe being scraped and cleaned before it was placed in his mouth by the experimenter and when the blindfold was removed he could see the pipe full of burned-out ash. Great care was taken to keep the periods required for exchange of pipes constant on both regular and control days. Judging from their reports this situation succeeded in fooling the most experienced smokers.

Nineteen subjects were used, nine nonsmokers and ten habitual smokers. One nonsmoker had been eliminated because he caught sight of the control pipe. Habitual smokers were not permitted to smoke for 3 hours prior to the experimental periods. Each smoker was permitted three puffs every 20 seconds for 25 minutes and various measurements were made at intervals before and after the smoking

¹ Hull, Clark L., *The Influence of Tobacco Smoking on Mental and Motor Efficiency*, *Psychol. Monogr.*, 1924, **33**, 150.

sessions. Under these conditions the following are examples of the many results obtained from the total experiment:

1. Steadiness was measured by having the subject insert a stylus into a hole only slightly larger than the stylus. Contacts with the sides of the hole were counted by an electrical device as a measure of steadiness.

There was a small but consistent increase in tremor after the smoking periods for both smokers and nonsmokers; tremor increased more in the habitual smokers than in the nonsmoker. Even at the beginning of the experimental period the habitual smokers showed themselves to be more unsteady.

2. Speed of adding was measured by having the subject add, as quickly as possible 6, then 7, then 8, to any two-place numbers named by the examiner. For instance, if the experimenter named 42, the subject would add 6 and obtain 48 then 7 to obtain 55, then 8 to obtain 63. Then he would add 6, 7, and 8 successively, beginning with the last obtained total of 63. In 30 seconds the experimenter would name a new two-place number as the new starting point. The score was the number of correct additions made in 5 minutes.

In speed of adding, nonsmokers were slower after smoking than they were before, and habitual smokers were faster. Nonsmokers decreased their scores by an average of 3 per cent, while smokers increased theirs by an average of 5 per cent. While this effect is slight, there were no exceptions within either group.

3. Rate of learning was measured by requiring the subjects to memorize one-syllable nonsense names given to geometrical forms. The forms were presented one at a time in a small window by a machine built for the purpose. Each form was presented for 5 seconds and in the middle of the exposure period the experimenter called the name of the form. Then, on the second and succeeding exposures (of the same five forms) the task of the subject was to attempt to give the names of the forms before the experimenter prompted him. The number of promptings a subject required before he could finally call off the correct names constituted a measure of his learning ability. Five new forms and names were presented for succeeding tests.

In rate of learning there was no definite or lasting effect on either group as a result of the smoking sessions. However, the habitual smokers did not learn quite as promptly as the nonsmokers at any time.

4. Heart rate was measured by taking the pulse at the beginning of the experimental sessions and at intervals throughout the periods of rest, testing, and smoking.

An unmistakable increase of almost 10 per cent occurred in the

heart rate during the smoking period of the habitual smokers. This effect persisted, gradually decreasing after smoking ended, but 40 per cent of the increase was still present $1\frac{3}{4}$ hours after smoking. Not enough records were obtained on nonsmokers to draw conclusions.

In summary we may conclude that tobacco increases the heart rate of habitual smokers, increases tremor in both smokers and nonsmokers, slightly slows the speed of adding in nonsmokers but slightly accelerates it in habitual smokers, and has no consistent effect on the rate of learning as measured by this experiment.

Aside from hand steadiness, Hull's studies showed that tobacco smoking, under the conditions tested, produces little effect on mental or most efficiency.

Other investigators have found that smoking produces a rise in blood pressure as well as heart rate, and a decrease in blood flow to the tiny vessels at the body surface with chilling of fingers, toes, and surface areas. But there has been disagreement as to whether or not these changes were caused by the habit-forming drug nicotine, or by other ingredients of tobacco, or in the case of cigarettes by burning paper. Roth, McDonald, and Beard¹ undertook a series of investigations designed to solve the problem.

The effects of smoking standard cigarettes and those made by corn silk were tested, using four male physicians and two female technicians as subjects. All six inhaled, all were between twenty-two and forty-one years of age, and all were habitual smokers in good health. To rule out possible effects on the circulatory mechanism of such extraneous factors as temperature of the room, clothing, position, physical activity, and psychic conditions, the investigators tested the subject's reactions repeatedly under a variety of carefully controlled conditions. Blood pressures, pulse, electrocardiographic tracings, skin temperature readings, and basal metabolism rates were obtained before, during, and after smoking sessions while the subjects smoked sitting, standing, lying down, and walking, in garments varying from light pajamas to street clothes. The smoking situations included smoking regular cigarettes, corn-silk cigarettes, puffing at an unlighted cigarette, cigarettes in ashless paper, and in a filter holder. Finally nicotine was injected intravenously while the subjects were not smoking, and all readings were obtained again.

After smoking corn silk, all results were negligible. But after two standard cigarettes heart rate increased an average of 36 beats a minute, blood pressure averaged a 19-point rise, skin temperatures dropped from 1 to 7 degrees, changes in heart action appeared on the

¹ Reported by R. Maris, *The Facts About Smoking*, *Hygeia*, 1944, 22, 740.

electrocardiograms, and basal-metabolism rates rose. The effects lasted for 15 minutes. The same changes occurred when ashless paper was used and when nicotine was injected. Results pointed unquestionably to nicotine as the offender. These investigators attributed these changes, as have others, to the effect of nicotine on sympathetic ganglia or nerve centers of the heart.

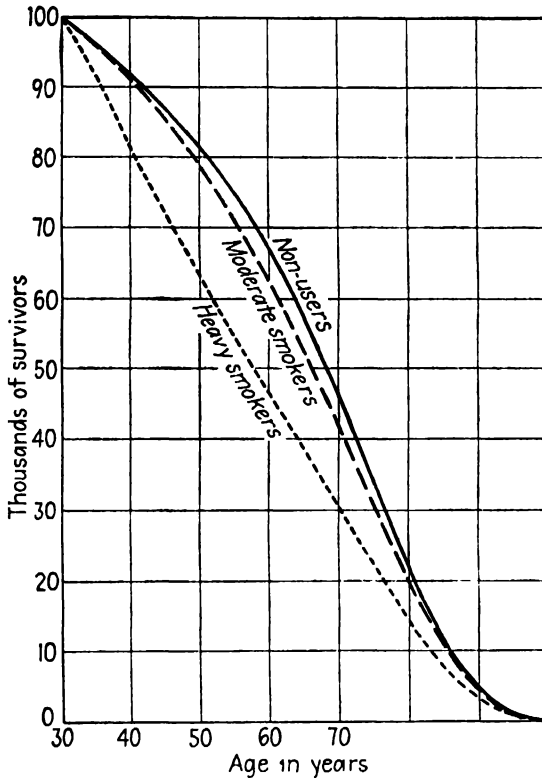


FIG. 36.—The survivorship lines of life tables for white males, falling into three categories relative to the usage of tobacco. *a.* Nonusers (solid line). *b.* Moderate smokers (dash line). *c.* Heavy smokers (dotted line). (From Raymond Pearl's *The Search for Longevity*. Courtesy of *Scientific Monthly*, May, 1938, p. 480.)

It appears that although the effects of smoking on psychological functions are rather slight and not of great consequence in the average situation, the physiological effects may be more significant. The question of bodily harm and possible effect upon longevity arises.

Pearl¹ studied the family records of 6,813 white males. They were then divided into groups of heavy smokers, light smokers, and

¹ *Op. cit.*, p. 43.

nonsmokers, and tables were compiled for these groups beginning at the age of 30 and ending at 100. It was found that the amount of smoking was associated statistically with a decrease in life span and that the amount of this increase became greater as the amount of smoking increased. These results are presented in Fig. 36. Although it is true that other factors besides smoking may have been common to the short-lived, heavy-smoking group and so determined the results, substantiating evidence of bodily harm comes from statistical studies made in the medical fields.

Without intending to assume that smoking is a cause of heart disease, English, Willius, and Berkson¹ of Mayo Clinic announce the result of a study of several thousand smokers and nonsmokers and patients with and without heart disease. Heart disease was found to be more prevalent among smokers than among nonsmokers.

Morton² likewise found in his study of 1,257 cases of abdominal operations grouped into three categories of (1) smokers (10 cigarettes a day or more) (2) light smokers, and (3) nonsmokers that heavy smokers are six times more likely to develop complications of the lungs following abdominal operation than are nonsmokers. He assumes, as have others, that smoking causes chronic inflammation of the trachea and bronchi, which is overlooked under ordinary circumstances. After operation, restriction of efficient coughing causes stagnation of bronchial secretion.

In some persons heavy smoking has produced defect of vision. This effect is first evidenced by an inability to recognize red and green. When intemperate use continues total loss of sight has occurred in rare cases.

Army surgeons have issued warning against smoking when injury to an artery has occurred because segmental spasm of the artery is a common result. In such cases the constriction of blood vessels caused by smoking may do irreparable damage. Presenting a cigarette to an injured person as a morale builder while he waits for the ambulance is entirely out of place.

It is probable that many smokers are fond of their smoke not so much because they are nicotine addicts as for other reasons. Handling the cigarette gives them something to do with their hands, fills in otherwise awkward voids in social situations, and gives the smoker a feeling of fellowship with other smokers. For the occasional light

¹ English, J., Willius, F., and Berkson, J., Heart Disease More Frequent among Tobacco Smokers, as quoted in *Science News Letter*, Nov. 2, 1940, p. 284.

² Morton, H., Danger for Heavy Smokers, as quoted in *Science News Letter*, Apr. 29th, 1944, p. 277.

smoker in good health and in the average situation, it is probable that the pleasure derived outweighs the harm done. But moderate and heavy smoking may be related to more serious effects and should be avoided by persons with heart disease or with disease of the small blood vessels lying near the skin.

SUMMARY

From the moment of birth man becomes, physically speaking, what he eats. An adequate amount of food and a proper balance between the various essential food elements is of paramount importance to his mental, emotional, and physical health.

Since the dawn of history man has been disposed to add certain substances to his diet that he does not need or even desire as foods but which he consumes because they bring about changes in his body, chiefly through their effects upon his nervous system, that result in pleasurable sensations or add to his temporary comfort. Many of these substances have value when used as medically prescribed drugs. When improperly used they may seriously disturb behavior, do temporary or permanent damage, or even endanger life. Because they disturb physical, mental, and emotional behavior, they are of interest to the psychologist. Several important categories of drugs have been described and their effects upon functioning discussed. A few of these do no serious harm. Others are to be avoided or taken in careful moderation since even in small dosages they seriously affect behavior and may lead to some of the abnormal conditions described in Chap. VIII.

RECOMMENDED SUPPLEMENTARY READINGS

- DORCUS, R., and SHAFFER, G.: *Textbook of Abnormal Psychology*, The Williams & Wilkins Company, Baltimore, 1945.
- EMERSON, HAVEN (Ed.): *Alcohol and Man*, The Macmillan Company, New York, 1939.
- MOSS, FRED, and HUNT, THELMA: *The Foundations of Abnormal Psychology*, Chap. 13, Prentice-Hall, Inc., New York, 1936.
- MORGAN, J. J. B.: *The Psychology of Abnormal People*, Longmans, Green and Company, New York, 1937.

CHAPTER VIII

PSYCHOLOGY IN MENTAL ILLNESS¹

- Historical Concepts of Mental Disease
- Modern Concepts of Mental Disease
 - Functional Disorders
 - Organic Disorders
- Mental Disease in This Country
 - Prevalence
- Symptoms of Mental Disorder
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 - Emotional Disturbances
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 - Emotional Instability
 - Fears
- The Major Psychoses
 - Organic Psychoses
 - Alcoholic Psychoses
 - Psychoses Associated with Syphilis
 - Senile Psychoses
 - Functional Psychoses
 - Schizophrenic Disorders

¹This chapter was written by Dr. Paul A. Brown, Assistant Professor of Psychology at the St. Lawrence University.

- Affective Disorders
- Paranoid Psychosis
- Factors Affecting Mental Disease
 - Age
 - Urban and Rural Environments
 - Heredity
 - Marital Status
 - American Population Groups
- The Treatment of Mental Disease
 - Psychotherapy
 - Chemical Shock Treatment
 - Electro-shock Treatment
 - Prefrontal Lobotomy

The description and understanding of behavior that is out of the ordinary is a matter of absorbing interest to the student who is beginning the study of psychology. This interest becomes even more intense when it is realized that the symptoms of abnormal behavior are simply the symptoms of normal behavior carried to an exaggerated degree and are best understood in terms of the same causal relationships that underlie the activities of the average man. Actually, the major value of the study of abnormal psychology consists in the insight the student acquires into his own behavior. Some of this has been presented in Chap. VI. It is the purpose of this chapter to describe the symptoms of mental illness, the major insanities, and some of the recent advances in the treatment of such conditions.

HISTORICAL CONCEPTS OF MENTAL DISEASE

It is quite probable that human beings have always been susceptible to mental illness. Even in very early written records we find mention of its existence. The Ebers Papyrus (1550 B.C.) gives evidence that the deterioration of old age, alcoholic reactions, and melancholia were recognized in ancient Egyptian medicine.¹ In the Bible we find frequent references to conditions we would today term as insane. One of the earliest is in Deuteronomy 28:28, "The Lord shall smite thee with madness, and blindness, and astonishment of heart." Similar references are occasionally found in the early writings of the Hindus and the Persians. The ancient Chinese described diseases as being due to the influence of evil supernatural factors. There can be little doubt that all of the conditions recognized today as psychotic have always existed. The lack of adequate diagnostic techniques

¹ Lewis, N. D. C., *A Short History of Psychiatric Achievement*, p. 26, W. W. Norton & Company, Inc., New York, 1941.

kept many of them from being recognized during the early days of civilization.

In their efforts to understand unusual and often spectacular behavior disorders, men, in those ancient days, resorted to superstition. A diffused demonology was presupposed, and evil spirits were believed to inhabit the bodies of afflicted persons. Treatment consisted in driving out such malevolent influences by the techniques of exorcism and torture, and it was a matter of religion rather than medicine. As time went on, this concept crystallized into one of an archdemon, Satan, who struggled with the individual for the possession of his soul. The unfortunate person was considered as in league with, or possessed by, Satan. Treatment was in the hands of priests and inquisitors. Witch scares were common and persisted into more modern centuries. The treatment was to purify the body by burning. Hollingworth¹ reports that in one European principality alone there were, within a few years time, the execution of over 6,000 witches!

With progress in medical knowledge, such a naïve approach became untenable, save in isolated areas. Instead, among the uninformed, mental illness was considered to be the result of a life of sin. The road to mental health was a life of piety. Such a belief, of course, is not widely held today, but it has resulted in an unfortunate carry-over. Many educated individuals who are objective in their approach to other matters still adopt a hush-hush attitude in discussing insanity as it affects their own circles. This is unfortunate, for many of the insanities are actually less vicious in their effect and more easily cured than many purely physical ailments.

Concomitant with the development of these popular approaches toward an understanding of insanity, there has always been a painfully slow, but encouraging, progress of medical science toward a more materialistic interpretation. Through the centuries, there have always been men with a gift for observation and description who, with great patience, have attempted to understand man in terms of his body. Even as early as the sixth century B.C., Alcmaeon is believed to have performed a human dissection.² In spite of frequent setbacks and the opposition of popular superstition, a growing accumulation of facts and a knowledge of diagnostic techniques gradually intruded into medical science, from which it infiltrated into popular sophistry. As education spread and people became more literate, the popular

¹ Hollingworth, H. L., *Abnormal Psychology*, p. 25, The Ronald Press Company, New York, 1930.

² Zilboorg, G., *A History of Medical Psychology*, p. 38, W. W. Norton & Company, Inc., New York, 1941.

beliefs became more and more similar to those of the doctor, and the mysticisms and superstitions were gradually discarded. Today, it is recognized by all educated peoples that a man termed "insane" is a sick man and that his care and treatment is best when in the hands of a competent psychiatrist. People no longer resort to exorcism. They go to the hospital.

MODERN CONCEPTS OF MENTAL DISEASE

Modern psychology attempts to understand abnormal behavior in nonmystical terms. However, so many factors are pertinent to the background of each condition that the importance of any one is often obscured. Two individuals may react in entirely different ways to the same physical situation or as a result of injuries to the same general brain area. This indicates that our approach must be of a clinical nature and that each case must be considered in terms of the whole life history of the person concerned.

There are, however, two major interpretations of abnormal conditions, both of which are helpful and both of which should be grasped by the beginning student. They are not to be thought of as antithetical viewpoints, but rather as complementary to each other. They are usually referred to with the descriptive labels of "functional" and "organic" psychoses.

Functional Psychoses.—The psychologist is interested in the manner in which an individual reacts to an environmental situation. These reactions, directed in part by the person's past experiences, determine to a large degree what his future reactions to somewhat similar situations will be. We say that such behavior is learned behavior. The schoolboy may learn to give the wrong answer because of misunderstanding. Similarly, individuals may learn to give wrong reactions on such a broad scale that their behavior sets them apart from their fellow men. They become objects of interest to students of abnormal psychology.

The writer has an acquaintance who believes all lawyers are either incompetent or dishonest. He will defend this belief with considerable vehemence. Such a false belief is termed a *delusion*. In this case, it is due to a series of unfortunate experiences with lawyers of both varieties. Some individuals maintain delusions so vigorously that it affects their entire behavior. They may believe that, because of their superior abilities, they are persecuted by a jealous society; or that they fail in the business world because of office politics; or that their enemies are poisoning their food or are directing death rays against them. Such individuals are termed *paranoiacs*. Examination fails to reveal

either an organic lesion or a toxic condition. It is not impossible that they have suffered from life experiences of such a nature that they have learned to rationalize their failures with bizarre delusions. Or, it may be in many cases that some obscure physical condition is operative but has eluded all diagnostic techniques. Nevertheless, the fact remains that there are a variety of mental illnesses, similar to paranoia, in which *no organic or toxic condition has been demonstrated as a dominant factor. Such insanities are termed the functional psychoses.*

Organic Psychoses.—The behavior of an individual may be altered because of a change in the physical condition of his body. A man may lose his ability to write because of fatigue in the muscles of his hand, or because he breaks his arm, or because of an injury to certain motor areas in the brain, or because of alcoholic intoxication or the delirium of fever, or simply because he is sleeping at that particular time. We cannot say he has learned an inability to write—though such a functional condition is not impossible—because here the source of trouble is patently a bodily condition.

Certain changes in the body sometimes bring about such vast changes in behavior that they fall within the subject matter of abnormal psychology. Long-continued overindulgence in alcoholic beverages (see also Chap. VII), the degenerative changes in the brain that may occur in old age, damage to the central nervous system by infectious diseases, changes in endocrine balance, particularly at certain critical life periods, damage to the brain as the result of injury—all seriously affect the individual's behavior. These conditions—some of which will be considered later—differ in point of origin from the functional interpretation *only in that the body's condition is a dominant factor in determining the total behavior picture.* Without such a structural change, such abnormal behavior would probably not have made its appearance. Actually, the past experience of the patient may be a predisposing factor and must always be taken into consideration.

Insanities best understood in terms of demonstrable organic pathologies are referred to as the *organic psychoses.*

MENTAL DISEASE IN THIS COUNTRY

The beginning student is, naturally enough, interested in just how widespread mental illness is in the country in which he lives. He may have known, in his own circle of acquaintances, cases of the nature to be described in this chapter. He is interested in the expectancy of such conditions among the general population and in how their frequencies compare with the incidences of other types of ailments. It is necessary, however, that the student be reminded of certain diffi-

culties in the way of presenting a clear picture of the field. Any discussion of such questions must be based on available statistics, and such do not always tell the whole story. In the first place, many mental conditions are never detected. The presence of a systematized delusion, a depression, or a withdrawing, shut-in personality may never be brought to the attention of a doctor, simply because the behavior may not run afoul of the law or become annoying to other individuals. Secondly, even in the best hospitals, it is frequently difficult to distinguish one kind of insanity from another, so that an analysis of statistics within the general picture may become somewhat confusing. In the third place, many cases are cared for at home or in private hospitals. Statistics for such cases are not available for public scrutiny. Finally, many analyses are based on first-admission figures. Such figures make no allowance either for changes in diagnosis or for cases that represent a recurrence of an old condition. Figures based on total admissions per unit time somewhat remedy the latter difficulty. These cautions must be borne in mind in interpreting the following section.

PREVALENCE

Landis and Page,¹ in a thorough analysis of the available data, indicate that in any one year approximately 0.5 per cent of the population of the United States is at some time part of the resident population in our mental hospitals. That this does not give the complete true picture is evident when it is realized that in such states as New York and Massachusetts, where mental-hospital facilities are more adequate, the figure is somewhat higher. Also, it must be remembered that the figures are based only upon those who are in mental institutions and do not include those in general hospitals, homes for the aged, or those who are cared for at home. As hospital facilities are increased, the total number of patients grows larger. As an example of this, the number of patients on the books of state hospitals increased between 1926 and 1938 from 272,716 to 424,118.² Thus, it would seem that a greater prevalence exists than the published hospital figures indicate. It has been estimated for New York State that, in 1917, 1.5 per cent of the male population was mentally ill.³

Those who do enter the hospitals occupy approximately half the

¹ Landis, C. and Page, J. D., *Modern Society and Mental Disease*, pp. 19-26, Rinehart & Company, Inc., New York, 1938.

² Maslow, A. I., and Mittelmann, B., *Principles of Abnormal Psychology*, p. 623, Harper & Brothers, New York, 1941

³ Landis and Page, *op. cit.*, p. 22.

available beds. However, this does not mean that there are as many mental cases as nonmental cases. About half of the mentally ill remain in the hospital for more than a year. In the general hospitals, however, the average bed occupancy is only about 2 weeks. During 1935, only 2 per cent of hospital admissions were for cases of mental illness. The principal functional conditions (schizophrenia, manic-depressive, and paranoia) account for approximately one third of these hospital cases. A breakdown of first admissions with respect to the kind of psychosis is presented in Table 86.

TABLE 86.—FIRST ADMISSIONS TO HOSPITALS FOR MENTAL DISEASE IN THE UNITED STATES, BY PSYCHOSIS, 1937*

	Number	Per cent
Total.....	110,082	100.0
With psychosis.....	93,236	84.7
General paresis.....	7,517	6.8
With other forms of syphilis of the C.N.S.....	1,629	1.5
With epidemic encephalitis.....	373	.3
With other infectious diseases.....	639	.6
Alcoholic.....	5,639	5.1
Due to drugs and other exogenous poisons.....	653	.6
Traumatic.....	586	.5
With cerebral arteriosclerosis.....	11,543	10.5
With other disturbances of circulation.....	742	.7
With convulsive disorders.....	1,952	1.8
Senile.....	8,530	7.7
Involutional psychoses.....	3,677	3.3
Due to other metabolic, etc., diseases.....	1,393	1.3
Due to new growth.....	174	.2
With organic changes of nervous system.....	875	.8
Psychoneuroses.....	3,795	3.4
Manic-depressive.....	12,626	11.5
Schizophrenia.....	20,658	18.8
Paranoia and paranoid conditions.....	1,812	1.6
With psychopathic personality.....	1,252	1.1
With mental deficiency.....	3,099	2.8
Other, undiagnosed, and unknown.....	4,072	3.7
Without psychosis.....	16,846	15.3

* From Maslow, A. H., and Mittelmann, B., *Principles of Abnormal Psychology*, p. 624, Harper & Brothers, New York, 1941.

The above figures do not include those individuals who have been discharged as cured nor those who will at some future time develop a psychosis. Thus, they fail to give the answer to questions concerning the statistical probability of an individual member of the population

becoming incapacitated by mental disease. Several analyses of available statistics bearing on this problem have been reported. After examining many of these reports, Landis and Page conclude that "while 1 out of every 20 born alive will eventually be admitted and spend some part of his life in a mental hospital, in all probability 1 out of 10 will be incapacitated, though not sent to a mental hospital, by mental disease at some time during his life."¹ These figures are high, but they should not be applied indiscriminately by the unwary student. As we shall see later in the chapter, there are many factors that affect mental disease, and, to some extent, those afflicted represent a select group of the population.

SYMPTOMS OF MENTAL DISORDER

A man who is mentally sick is quite apt to reveal the fact, and the nature of his sickness, in his behavior. It is important, however, to realize that his behavior differs from normal behavior more in *degree* than in *kind*. All of the signs of a sick individual are possessed by the healthy person, but to a lesser extent. Bearing this in mind, the beginning student should avoid stressing the significance of these symptoms in applying them to himself. Abnormal behavior is merely exaggerated normal behavior. All of us possess at times all of the symptoms that are to be described. They are, however, incidental to our personality integration. In the psychotic individual, the symptom frequently becomes a dominant factor in the control and regulation of his behavior.

A list of symptoms may be classified in various ways. The scheme used here roughly divides the characteristics of mental illness into four major groups. An individual may have a distorted awareness of the world about him. This may reveal itself in unusual interpretations of his *sensory* experiences. As a result, he may react in an unusual fashion, and his illness may be reflected in his *motor* responses. Or his abnormalities may be primarily *intellectual*. He may have false ideas, fits of forgetfulness, an inability to think clearly, or a rigidity of his thought processes. Finally, insanity may show itself through the *emotional* behavior. The patient may be dejected to the point of suicidal attempts or so excessively elated that he must be restrained. The symptoms will be discussed in terms of these four groups.

SENSORY DISORDERS

Illusions.—An illusion is a false perception, an incorrect interpretation of a stimulating situation. The student who fancies a dark shadowy mass in the corner to be an animal, only to discover it later

¹ Landis and Page, *op. cit.*, p. 25.

to be a carelessly thrown overcoat, is experiencing an illusion. The mental patient in the hospital may interpret the creaking of a door or howling of wind as the shrieking of a voice carrying threats or insults to his person. He, too, is experiencing an illusion with somewhat more severe personal implications.

Hallucinations.—Hallucinations are perceptions in the absence of an adequate stimulus. They may affect any of the senses. Even though no real external sounds are present, the patient may hear voices shrieking imprecations in his ear. The victim of a delirium may see strange animals moving about the room, may feel insects crawling over his skin, or may smell unusual odors—and interpret them as poison gases sent by his enemies to kill him! Many patients will describe electric “radio” vibrations they feel passing through their bodies. Normal individuals experience hallucinations when they dream.

Perceptual Insufficiency.—The patient pays but little attention to the surrounding environment and fails to grasp adequately everything that occurs. He may not know what is said to him; he may not realize where he is or how he got there. He may be bewildered, showing poor orientation with respect to space and time. In cases of extreme degree he may be in a wild and undirected state of excitement or almost in a state of coma, and the condition is known, descriptively, as *clouding of consciousness*.

MOTOR DISTURBANCES

Overactivity.—In this condition the patient is in a constant state of excitement, always “on the go.” He cannot lie or sit, nor can he relax. He is restless, sleepless, engaged in continuous activity. He will not take time out for eating or sleeping; he may jump about, breaking furniture, discarding his clothes, shouting, and dancing. In a mild state, the individual may carry on his everyday activities, but with tenseness and great pressure. In severe states he must be restrained.

Retardation.—Here, a condition opposite from the above prevails. The patient may be able to carry on his work, but only with great difficulty. His every action is delayed and slow. He drags his feet, his speech is sluggish, and he prefers inactivity. In extreme cases he is apparently unable to do anything and must be washed, fed, and cared for by attendants.

Stereotopy.—This term refers to a tendency found in some patients to carry on mechanically the repetition of a certain act or of certain phrases or sentences. Just as a small child will repeat over and over some short combination of words or a bit of doggerel, so will these patients dwell endlessly on a theme that is meaningless to the listener

or repeat continually some simple gesture. It is usually supposed that such stereotopy possesses some symbolic meaning to the patient.

Negativism.—A patient exhibiting this symptom refuses to perform acts that are appropriate to the situation. In extreme cases the patient will do nothing at all. He will not talk nor pay any attention to things done or said to him. Food can be placed in the mouth, but it will not be swallowed. In less extreme cases the negativism may be shown only in certain kinds of actions. For example, a patient may carry on all regular activities but refuse to talk (*mutism*).

Suggestibility.—This symptom pertains to an abnormal tendency found in some patients to yield to suggestion. The patient may retain his body in even the most awkward of positions, once it is placed in that position by someone else (*waxy flexibility*), or he may repeat everything that is said to him (*echolalia*) or mimic the actions of those around him (*echopraxia*).

INTELLECTUAL DISTURBANCES

Amnesia.—By amnesia, is meant a total or partial loss of memory. This memory loss may be either for the events preceding a shock or disturbance or for the events immediately following. It may be localized to the extent that it refers only to certain incidents, times, or places; or it may be so complete that the patient has forgotten his name, where he is, or how he got there.

Retrospective Falsification.—When events are remembered not as they really occurred but in a changed and distorted fashion, we say the individual has retrospectively falsified his account. This is not the same as conscious lying. The patient will defend his story stoutly and with full belief. Normally, this happens in all individuals, because none of us have perfect memories and we are influenced by motives of which we are not conscious. However, our accounts are not as obviously distorted as are those of a mental patient.

Associational Disturbances.—Normally, our thought processes consist of a continuous succession of associations, whether they are controlled (as in solving a problem in calculus) or random (as in ordinary daydreaming). As would be expected, we find peculiar distortions of this activity among mental patients. Some show a stereotopy, their conversations all revolving around some simple theme. Others are excessively and morbidly preoccupied with some more complicated idea (such as the thought that one is about to die). Such symptoms are termed *obsessions*. Others are preoccupied with their own health and body sensations (*hypochondria*).

Still others relate all their thinking to their own emotional conflict (or *complex*). Often, associations given verbally by patients are symbolic of deep-rooted, unconscious problems.

Dearth of Ideas.—Some patients have considerable difficulty in forming associations or at least in giving expression to them. They may find it difficult to concentrate on a problem or almost impossible to think of things to say. They reply to simple questions only after a long interval and often with the answer, "I don't know." They may even refuse to talk at all, staring dully at the doctor as if not comprehending him. These symptoms are highly characteristic of those psychoses in which a depression is a prominent feature.

Flight of Ideas.—Some patients show an abnormal tendency to jump from one topic to another. There is an apparent lack of ability to keep to the subject under consideration. Any stimulus, whether relevant or not, is incorporated into the associational chain. The individual may talk on for hours and exhibit neither selective control nor normal inhibition in his rambling. This symptom is prominent in cases where a mild mania is prevalent.

Delusions.—A delusion is a false belief. All normal individuals have some delusions as the result of misinformation, overgeneralization, or emotional or intellectual bias. In mental patients, delusions are often exaggerated to the point of absurdity. One will tell you he is the saviour of the world; another, that he is the worst sinner that has ever lived. A patient may say that his food has been poisoned by his enemies—and go right on eating it! Another may say that his internal organs have rotted away, or that he has been dead for years and is just a phantom. When delusions are logically organized, with all facts coordinated into the scheme in a plausible fashion, we say they are *systematized*. When delusions are loosely organized, fragmentary, and rather weakly woven, we refer to them as *unsystematized*.

Disturbances of Judgment.—Sometimes an individual may lose normal control over ordinary judgment. He will squander all his money in an unnecessary fashion, such as buying several cars when he already has one; or he may write large checks when he has no bank account. He may become excessively careless in his dress, his conversation, his ordinary activities. He may become uninhibited to the point of embarrassing his friends and family. He may lose the ability to foresee the consequences of an act. He has lost a sense of balance in his judgment.

Dementia.—By this is meant a condition of intellectual deterioration, usually permanent and frequently progressive. The patient becomes less able, mentally. He experiences difficulty in concentrat-

ing his attention upon a problem, and is less flexible in his attack upon its solution. Interest in new experiences, and even in familiar situations, is dulled. It is hard for him to remember, the forgetfulness sometimes extending to his most intimate affairs, such as the place of his birth or the names of his relatives.

EMOTIONAL DISTURBANCES

Apathy.—By apathy, we mean emotional indifference. The apathetic individual apparently just doesn't care. Regardless of how you stimulate him, it is almost impossible to bring forth the normal emotional reactions of anger, fear, or joy. He seemingly has divorced himself from the surrounding world and is out of emotional contact with the objective environment. For this reason, emotional apathy is usually considered a very serious condition.

Depression.—The depressed patient presents an attitude of dejection, often accompanied by feelings of anxiety and hopelessness, even in the absence of situations that should normally call forth such attitudes. He may refuse to eat, may moan constantly and ask for the forgiveness of imaginary sins. Such patients must be constantly watched, for there is an ever-present threat of suicide.

Emotional Instability.—Some patients have little or no control over their emotional reactions. At the slightest provocation they will exhibit violent anger leading to excess in behavior. Just as quickly, they will "snap back" to normal. They may become quickly enthusiastic about a project or cast down into sorrow at the least setback, swinging from high ambition to the depths of despair in a comparatively short time.

Fears.—Morbid fears are frequently found in mental patients. They may be obsessed with the idea of committing suicide or of sudden death from heart failure. They may fear the designs of unspecified enemies; or they may simply have an unlocalized anxiety that they cannot justify nor explain but which is, nevertheless, troublesome. Violent, panicky fears are often encountered among those suffering from the hallucinations of *delirium tremens* (see below). Fears are also not uncommon among depressed conditions.

THE MAJOR PSYCHOSES

Within the space limits of the present chapter it is impossible to give an extended discussion of the psychoses, nor is it possible to give illustrative case material. The student is urged to supplement his

reading with the use of one of the standard texts in the field such as that of Dorcus and Shaffer.¹

It must be kept in mind that no two cases with the same diagnosis present identical pictures. The symptoms in any one case may vary strikingly from time to time. Diagnosis, at its best, is a somewhat precarious task. Nevertheless, certain common denominators are found that justify classification within certain limits. It is with these common denominators that we will concern ourselves.

ORGANIC PSYCHOSES

Alcoholic Psychoses.—The problem of alcoholism is of very great importance, whether the point of view adopted be that of the sociologist, economist, or psychiatrist. Over 5 per cent of first admissions to our mental hospitals (see Table 86) and between 10 per cent and 15 per cent of total admissions each year are alcoholic psychoses. In addition, it has been estimated that over 100,000 persons in our country suffer from alcoholism.² We will describe the most common kinds of these unfortunate disorders. A more extended discussion of conditions due to alcoholic excesses was given in Chap. VII.

Delirium tremens, as is suggested by the name, is characterized by a state of delirium accompanied by generalized tremors, principally in the facial muscles, fingers, and tongue. It occurs in the course of chronic alcoholism (see below), usually after a period of heavy drinking with little food. The patient is sleepless and restless, is disoriented in both time and space, and experiences almost constant hallucinations. The emotional component of the condition is almost uniformly an intense and irrational fear. Suicidal or homicidal attempts may be present. The delirium usually lasts 3 to 6 days, the patient sinking into a heavy sleep from which he awakens in a lucid state, though with an amnesia for the period of delirium. More than 85 per cent of the cases recover fully.³ The most common immediate cause of death for the remainder is a complicating pneumonia.

Chronic alcoholism is a term referring to the condition of an individual who drinks habitually and heavily. Such a condition is not to be confused with that of periodic drunken sprees separated by relatively

¹ Dorcus, R. M., and Shaffer, G. W., *Textbook of Abnormal Psychology* (3d ed.), The Williams & Wilkins Company, Baltimore, 1944.

² Appel, K. E., Psychiatric Therapy, in Hunt, J. McV. (Ed.), *Personality and the Behavior Disorders*, Vol II, p. 1145, The Ronald Press Company, New York, 1944.

³ Rosanoff, A. J., *Manual of Psychiatry*, p. 387, John Wiley & Sons, Inc., New York, 1938.

long periods of sobriety (*dipsomania*). The individual characteristically suffers from loss of memory, some degree of dearth of ideas, an inability to concentrate, with poor judgment and unclear thinking. Delusions sometime develop, and these are apt to be of self-accusation and unworthiness. Physically, he exhibits mild tremors and is apt to have circulatory and gastrointestinal disorders. The best treatment for chronic alcoholics seems to be complete abstinence.

Korsakow's psychosis develops most frequently in late middle age and is found more frequently among women than men. The essential features are amnesia for recent events with a tendency to confuse these with remote events; disorientation in space and time; retrospective falsification; fair memory for events preceding the illness; and absence of cloudy consciousness, the patient being lucid and understanding. The patient may develop an insight into his condition and complain of his poor memory. He may spend several months or longer in the hospital, and chances of recovery are poor (see also Chap. VII).

Psychoses Associated with Syphilis.—*General paralysis of the insane*, frequently called *paresis* and *dementia paralytica*, accounts for the largest proportion of the syphilitic mental conditions, which comprise approximately 10 per cent of our hospitalized mental patients (Table 86). Of the approximately 4 individuals per 1000 population in the United States who contract syphilis, about 5 per cent, or 2 per 10,000, develop the condition. It occurs among men more commonly than women in a ratio of nearly 4 to 1, and the majority of patients are between the ages of thirty and sixty years. It is found nearly twice as frequently among Negroes as Whites, and nearly 4 times as often in urban as in rural populations.¹

Beginning 10 to 20 years after the first infection, the disease develops slowly, usually manifesting three general stages. In the first stage, the mental symptoms include poor memory, impairment of judgment, and a reversal of mood and character. Neatness is replaced with slovenliness, efficiency with carelessness, caution with recklessness. There is frequently overindulgence in alcohol and sex activity. The individual may feel in good health and refuse to see a doctor, though medical examination would detect neural involvement through reflex disturbances. If left untreated, the second phase gradually develops and the symptoms are now quite marked. The voice is thick and words are slurred. There is frequently difficulty in controlling the muscles used in walking, and the patient walks with a trembling gait. There is much mental confusion, disorientation, and frequent unsystematized delusions. These latter may be expansive,

¹ Rosanoff, *ibid.*, pp. 339-343.

and the patient may talk glibly of his great wealth or power; or they may be melancholy or depressed in nature. If the disorder progresses into the third stage, the patient is helpless and bedridden. He becomes completely disoriented, suffers from tremors and convulsions, the condition becoming progressively more severe, with death as the terminal point.

Cerebrospinal syphilis develops rather soon after the initial syphilitic infection (6 months to 5 years). The onset is rapid, only a few weeks being required for full development of the symptoms. The patient suffers from severe headache, a feeling of dizziness, will vomit, is unable to sleep, and yet may present a somewhat lethargic picture to the examiner. Normal reflexes are disturbed; the Argyll-Robertson sign is usually absent *i.e.*, pupillary reaction is present to far and near accommodation but is absent to light. Any of the cranial nerves may be involved. Diagnosis of the condition is made by means of both clinical and laboratory tests.

Tabes dorsalis with psychosis occurs in some cases of syphilitic infection, where the posterior roots of the spinal column are involved preventing proprioceptive impulses from the muscles from reaching the brain. The patient becomes unable to control adequately such motor activities as walking, talking, and writing. Tremors and disturbances in these activities are pronounced. The individual can stand with his eyes open but will fall if they are closed; walks, aided by a cane, with a trembling gait; slurs his words, and the like. Double vision and dimness of vision frequently occur. When definitely psychotic, the patient is agitated, may suffer from delusions of a persecutory nature and from fear-producing hallucinatory experiences.

Senile Psychoses.—The most frequently occurring psychosis associated with old age is *senile dementia*, one of the commonest of psychiatric conditions. Its incidence in the general population of all ages for the year ending June 30, 1935 was 6.9 per 100,000. For the year 1920, in New York State, its incidence for only that portion of the population over sixty years of age was 80 per 100,000; for persons aged seventy years or more, the rate was 180.2. It occurs more frequently among women than men in a ratio of about 10 to 6.¹ While associated with old age, the exact cause of the condition is unknown.

The chief symptom is an impairment of memory with pronounced tendencies to retrospective falsification and pseudoreminiscence. Memory failure is most marked for recent events. As the condition progresses, there is a pronounced narrowing of interests, a general apathy, and, frequently, irritability and depression. Delusions of a

¹ *Ibid.*, pp. 513-514.

persecutory nature are also quite apt to appear. The patient may become self-centered and demanding in the satisfaction of his comfort. As little is known of the prevention of the condition, the treatment consists in institutional or home care. The duration is usually less than 5 years and is invariably terminated in death.

Presbyophrenia is a type of senile dementia somewhat resembling, in its clinical picture, Korsakow's psychosis. The patient is unable to remember recent events and lacks insight into his present condition. He appears to be mentally more alert than the simple senile patient. There is considerable confabulation and contradiction in his conversation. Frequently he is restless and unable to continue long in simple tasks. The prognosis and treatment are about the same as for cases of senile dementia.

Cerebral arteriosclerosis, while it can occur at earlier ages, is found most frequently among people in late middle age or older. For the year ending June 30, 1935, of 2281 cases in the New York state hospitals, 1342 were sixty-five years or over in age, 688 were between ages fifty-five and sixty-four, 228 were between ages forty-five and fifty-four, and the remaining 23 were all over thirty-five years old.¹ It occurs more frequently among men than women. It is not always accompanied by a psychosis. High blood pressure coupled with the hardening of the arteries of the brain may result in the bursting of cerebral blood vessels. As a result of this stroke, the individual may suffer from the loss of ability to concentrate, yet retain an insight into this decreased efficiency. Frequently there are found depressions, confused states, clouding of the consciousness, irritability, and emotional instability.

FUNCTIONAL PSYCHOSES

Schizophrenic Disorders.—These conditions represent the most commonly encountered group of all the major psychoses. Malzberg presents data showing that in New York State mental hospitals, during the years 1929 to 1931, schizophrenia accounted for 26.3 per cent of total first admissions, and Dayton's data for first admissions in Massachusetts between 1917 and 1933 for the same condition are 19.46 per cent.² The term schizophrenia literally means "split mind." It refers to a disintegration of the individual's personality structure that is so characteristic of the disease. Since it was once believed that young

¹ *Ibid.*, p. 509.

² Cameron, "Ornament," *The Functional Psychoses*, in Hunt, J. McV. (Ed.), *Personality and the Behavior Disorders*, Vol. II, p. 872, The Ronald Press Company, New York, 1944.

people were particularly prone to develop this insanity, it is sometimes called *dementia praecox*, a "deterioration of youth." Actually, cases can be found at all ages, the greatest number occurring between ages twenty and thirty.

No other psychosis presents so baffling and varied an array of symptoms, nor is any other psychosis so little understood. All of the symptoms do not appear in any one patient, and an individual clinical picture may change strikingly in a very short time. There are, though, certain basic common denominators running through the behavior of these patients. The outstanding characteristic is an emotional apathy or indifference, coupled, frequently, with a disharmony between intellectual and emotional reactions. Normal anger- or fear-producing situations fail to bring forth the appropriate response. There is also evidence of withdrawing behavior, as if the patient retreats from the external world and has trouble distinguishing fact from fancy. The result of such social retreat is to place a psychological barrier between the patient and other people. He becomes socially inaccessible. Attainment of rapport on the part of the physician is quite difficult and at times impossible. There is increasing personality deterioration, the patient becoming careless in behavior and appearance. Mental deterioration may also occur. Ideas of reference and a self-centeredness of attitude are often found.

For purposes of classification, it has been found convenient to describe four special types of schizophrenia. This does not mean that we have to contend with separate and distinct conditions. It only means that at the time of diagnosis a particular group of symptoms predominated. These types have the common characteristics of schizophrenia plus other particular symptoms. All schizophrenic cases cannot be classified into any one definite type. Many are mixed cases possessing symptoms of more than one type.

Simple schizophrenia is one of these types. The outstanding characteristics are emotional apathy, indifference, a loss of ambition, and general listlessness with some intellectual deterioration. The individual may become asocial and seems to be increasingly preoccupied with his own daydreams or fantasies. The onset is so gradual it is frequently not noticed. Many cases are never hospitalized but manage to take care of themselves. It is quite possible that cases of this type are found among tramps, prostitutes, and the unemployed. It can occur at any age but is found most frequently among young adults.

Hebephrenic schizophrenia is the classification given to a rather large and varied group. The condition has a more sudden onset than

the simple type, and much greater disintegration is shown. The behavior is usually pointless and incongruous with respect to the situation. There is apt to be inappropriate smirking and laughter. Many bizarre notions are held by the patient, and we frequently find unsystematized delusions. There may be occasional hallucinations. Hebephrenic literally means "child mind," but the behavior is really not so childish as it is irrelevant and inappropriate.

Catatonic schizophrenia refers to those cases where the dominant symptoms involve disturbances of motor behavior. The chief characteristic is motor stereotypy, but the behavior may range from violent excitement to deep stupor. Between these ranges we may find less dramatic mannerisms of posturing, gesturing, repetitious stereotyped grimacing, and the like. It is believed that these mannerisms may have a symbolic meaning, best understood in terms of some inner emotional conflict. In the case of stupor, the patient is completely negativistic and must be cared for as if an infant, although he is frequently aware of happenings in his vicinity. When in a state of catatonic excitement, the patient's behavior is unpredictable. For that reason, such cases are potentially dangerous and require great care in handling.

When delusions of either the persecutory or grandiose type are predominant symptoms, the case is diagnosed as *paranoid schizophrenia*. Other symptoms (particularly of the hebephrenic variety) are also present but are subordinate to the delusional picture. The delusions are not as well systematized nor as firmly defended as those of true *paranoia* (see below). Additional symptoms include apathy, disintegration, and withdrawing behavior. This form of schizophrenia responds to treatment even less readily than the other forms.

Affective Disorders.—Under this heading we group those functional conditions characterized chiefly by abnormal manifestations of mood and emotion. Principally, these refer to the elated and depressed conditions where, most frequently, no deterioration of intelligence has occurred. There are two important psychoses found in this group; *manic-depressive* disorders and *involucional melancholia*. In the report of Malzberg referred to above,¹ the manic-depressive group made up 13.4 per cent of the first admissions to New York State mental hospitals during years 1929 to 1931, and involucional melancholia accounted for 2.8 per cent. Dayton's figures for Massachusetts (1917 to 1933) give 9.66 per cent manic-depressives and 2.17 per cent involucional disorders.

¹ Cameron, *op. cit.*, p. 872.

Extremes of emotion are the chief characteristics of the manic-depressive psychosis. An individual who has previously exhibited quite normal behavior may develop, either gradually or quite suddenly, a state of great elation and pronounced motor overactivity and suggestibility, exhibit flight of ideas in conversation, and present a picture of markedly happy contact with the environment. Emotional instability is present, as irritation appears at any thwarting or restraint. The patient does not want to take time for eating, sleeping, or elimination and is constantly "on the go" and in pronounced good humor. In extreme cases (*acute mania*) these symptoms are all exaggerated, and delusions of grandeur or achievement may appear. There may be transitory hallucinations. Behavior is recognized, even by the uninformed, as definitely pathological. Occasionally the behavior may develop to the point of wild delirium (*hyperacute mania*). Here there are complete disorientation, frequent hallucinations, and continual activity that throws a strain on the cardiorespiratory system that may have fatal consequences.

The reverse of all this may occur. The attack may result in a state of depression, considerable motor retardation, a dearth of ideas, and a general picture of unhappy dejection. The patient is blue without understanding why. He may rationalize his sadness with delusions of sin or unworthiness. The depression may become more severe (*acute melancholia*) with an exaggeration of the above symptoms. The patient apparently gives up and will sit motionless for hours, sometimes mumbling to himself phrases indicative of self-accusation. In some cases the patient will fail completely in establishing environmental rapport. He will lie without moving, must be tube-fed and cared for, usually suffering physical impairment. This state is known as *depressive stupor*.

Manic-depressive psychosis occurs most frequently in middle life, and either, or both, of the above states may be present. The patient recovers, usually in less than a year, but there is always danger of recurrence. A manic state may be followed by a period of normal behavior or may change over night to a depression. Attacks are frequently brought on by a precipitating cause. They may be separated by days or years, or there may never be another attack. Any combination in sequence of the states of normality, mania, and depression may be found with any time-interval separating them. The prognosis of recovery from any single attack is good.

Involutional melancholia is most apt to occur at that time of life when the sex glands cease to function. Although it may occur in either sex, it is found more frequently among women and at an earlier

age than in men. The patient becomes quite depressed and anxious. Life apparently has no future, and there is a dissatisfaction with the past. Apprehensiveness and irritability are commonly present. The patient experiences feelings of unreality and may develop delusions that he doesn't exist. Ideas of sinfulness and unworthiness are also common. Motor and intellectual retardation are often found, but in some cases there is considerable agitation with restless fearfulness. Recovery from involutional melancholia is normally to be expected.

Paranoid Psychosis.—A not very common, but interesting, psychosis, in which the only symptom of any importance is a well-systematized delusion, dominating the entire attitude of the patient and subordinating all his activities, is the condition known as *paranoia*. Since the only abnormal phase of behavior is the rigid and vigorously defended delusion, many paranoids probably are not hospitalized. It is only when, in conformity with their false belief, they infringe on the rights of others or run afoul of the law, that they are noticed. Hence, the reported hospital incidence of between 1 per cent and 2 per cent¹ is probably not representative of the true figure.

The patient who develops paranoia is apt to have had, most of his life, a somewhat rigid type of personality. He is apt to have been the sort of person who cannot easily accept correction or make concessions; who has been over sensitive and unduly concerned with what others are thinking of him; who has had a tendency to brood and has been inclined to self-isolation. He has usually been suspicious of the goals and motives of others, with a tendency to ascribe special meanings with relation to himself to the indifferent activities of acquaintances. From such a background the delusional system develops slowly but with increasing strength. When it has become recognizably pathological, it is usually so firmly systematized and so logically organized that little can be done toward the patient's re-education. The delusion may be persecutory or of the compensatory variety of *grandeur*. It may also take other forms, such as religious, amorous, jealous, inventive, litigious, or reformatory paranoia. When well developed, paranoia has a very poor prognosis.

FACTORS AFFECTING MENTAL DISEASE

AGE

One of the most important facts that we can know about a patient is his age; and about a group of patients, the age distribution of the group. The care and treatment of the patient and his chances

¹ *Ibid.*, p. 872.

of recovery will very largely depend upon his age. Knowing the age distribution of the group enables us to predict with considerable accuracy the sex distribution, the number in each group of diseases, the years of expected life, and other pertinent problems with respect to the group.

Although the actual number of first admissions of patients under fifty years of age is greater than of those aged over fifty, it must be remembered that the proportion of the total population under fifty is also greater. When first admissions are expressed in rates per 100,000 of the general population of the same age, it is found that the incidence

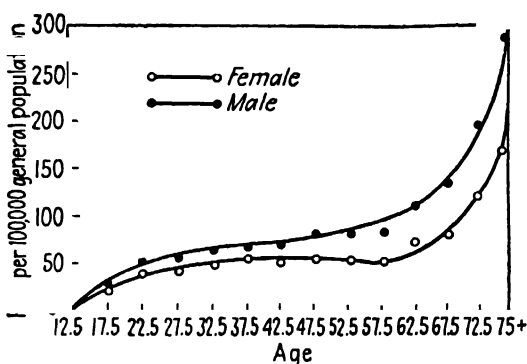


FIG. 37.—Number of first admissions to state mental hospitals in the United States during 1933, by age and sex, expressed as rates per 100,000 of the corresponding general population as of 1933. (From Landis, C. and Page, J. M., *op. cit.*, p. 28.)

of mental disease increases with age. This is not a constant relationship. There is a sharp increase in incidence between ages fifteen and thirty and another beyond age sixty. During the years forty-five to sixty the rate does not vary greatly. At all ages, the rate is consistently higher for males than for females.¹ These facts are presented in Fig. 37. Evidence has also been presented that the median age at first admission has increased markedly for all psychoses with the exception of schizophrenia and involutional melancholia.² The reasons for this are obscure, and no explanation is offered.

In studying the factor of age with respect to specific psychoses, we find, in a broad way, that each psychosis has its own age span.³ Mean ages for the various conditions may differ as much as several years. The distributions for most conditions are bell-shaped and are presented

¹ Landis and Page, *op. cit.*, pp. 27-31.

² Landis, Carney, and Farwell, J. E., A Trend Analysis of Age at First-admissions, Age at Death, and Years of Residence for State Mental Hospitals: 1913-1941, *J. Abnorm. Soc. Psychol.*, 1944, **39**, 3-23.

³ Landis and Page, *op. cit.*, pp. 36-38.

in Fig. 38. Curves for the senile conditions are not presented, since the tendency for census and hospital reports to combine all patients older than seventy years in one group would result in the highest rates being found at the upper age level.

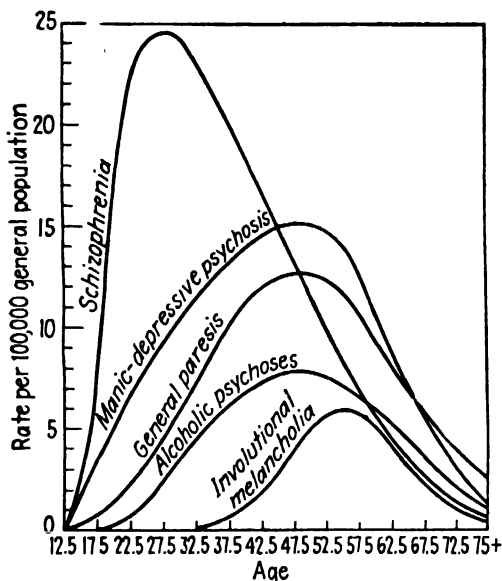


FIG. 38.—Number of first admissions to state mental hospitals in the United States during 1933, by age and psychosis, expressed as rates per 100,000 of the corresponding general population of 1933. (From Landis, C., and Page, J. M., *op. cit.*, p. 37.)

URBAN AND RURAL ENVIRONMENTS

A commonly held belief is that the complexity of life in a large city places increasing strain on a human being's adjustive capacity and leads to a greater frequency of mental breakdown. It will be profitable to consider the facts bearing on this belief. The United States census arbitrarily classifies communities with less than 2,500 inhabitants as rural; all others are urban. Comparing these two groups, very real differences do appear. The average rural rate of first admissions per 100,000 population in 1933 was 44.6 for women, 69.5 for men, a combined rate of 58.0. These are to be compared with urban rates of 94.1 for women, 134.8 for men, a combined rate of 113.5.¹ But it must be remembered that large centers of population have more hospitals and better medical facilities. Cases that might go undetected or be cared for at home in a small town are more apt to be hospitalized in the city. Thus, to really examine the problem, it is necessary to compare the

¹ *Ibid.*, p. 46.

incidences in cities of different sizes. When this is done, it is found that the most marked difference is found between communities of less than 2,500 population and those between 2,500 and 10,000. This is illustrated in the data¹ below showing the incidence rates per 100,000

Population	Incidence Rate
2,500 or less.....	61.6
2,500 to 10,000.....	87.6
10,000 to 25,000.....	87.7
25,000 to 100,000.....	98.2
100,000 to 200,000.....	106.6
New York City.....	105.4
Total urban.....	102.7

population. Thus, it is probable that the increased urban incidence is at least partly explained in terms of improved and more easily obtainable medical facilities.

HEREDITY

A popular belief of "the man in the street" is that insanity is inherited. The statement, of course, is too indefinite to have any real meaning. There are many different kinds of insanity and each specific psychosis has its own complex of etiological factors. The role of heredity may not carry the same import in one disease that it does in another. Also, it must be remembered that to say heredity is a factor does not mean that the children of a patient will necessarily acquire the disease. It simply means that, statistically, there is a greater probability that the psychosis will appear among close relatives than in the general population. Also, in considering the problem, we must bear in mind that much of the evidence is not very reliable. We cannot be sure of the accuracy of diagnosis, for in the past many of these conditions were simply grouped together under one heading. Also, available figures do not include those relatives who were unhospitalized and undetected.

The actual significance of the factor of heredity is by no means as yet settled. Among the psychoses considered in this chapter, inheritance seems to play an important role in the schizophrenic disorders and in manic-depressive conditions. It has been reported² that the children and relatives of patients with these diseases have a greater expectancy of themselves becoming patients than is found in the general population. When one parent is schizophrenic, the expectancy rate for children is around 16 per cent; when both parents have the

¹ *Ibid.*, pp. 50 and 164.

² *Ibid.*, pp. 81-87.

disease, the rate is close to 68 per cent. Siblings of the patient have an expectancy rate of from 8 per cent to 24 per cent. These figures should be contrasted with the fact that less than 1 per cent of the general population can be expected to develop schizophrenia. Children of manic-depressive patients have a mental-illness expectancy rate of from 10 per cent to 24 per cent. If neither of the parents has had the disease, siblings have an expectancy rate of 7.4 per cent; but if one of the parents has been a mental patient, the figure is close to 24 per cent. These data all clearly indicate that the factor of heredity is important in any consideration of mental illness.¹

MARITAL STATUS

Another popular belief is that mental disease is in some way related to marriage. As Fig. 39 shows, this popular belief is borne out by the

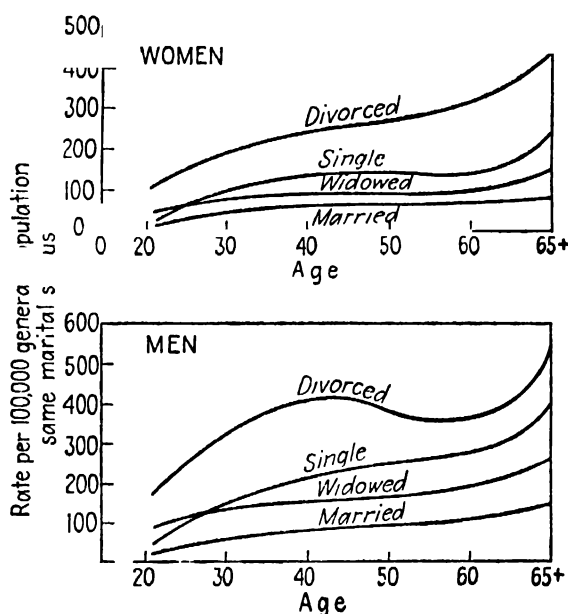


FIG. 39.—Number of first admissions to state mental hospitals in the United States during 1933, by marital status, expressed as rate per 100 000 of the general population.

reported facts.² The incidence of first admissions per 100,000 general population during 1933, when corrected for age differences between the

¹ Heredity is also important in the consideration of mental deficiency with psychosis and epilepsy. However, this group of patients make up only about 5 per cent of the first admissions.

² *Ibid.*, pp. 69-76.

groups, was 73 for married men, 161 for widowers, 221 for bachelors and 362 for divorcees. The corresponding figures for women were 59, 92, 130, and 263. Among the women, there were two exceptions to this general trend. Female alcoholic patients and female paretics (general paralysis) had a slightly smaller group of single members than the general population. Probably such women are less inhibited and have greater opportunities for marriage. In all the organic conditions there were a larger percentage of widowed patients than is found in the general population. The high rate of divorced individuals would be expected, as such people do not tend to have a happy married life.

AMERICAN POPULATION GROUPS

All available figures indicate a greater prevalence of mental disease among immigrant groups than among native-born citizens of the United States, but such figures are usually presented in a manner uncorrected for such factors as age, sex distribution, economic status, and urbanization. As Landis and Page point out,¹ an earlier study had shown mental disease occurred more frequently among native Americans who had migrated from the east to California than among native-born Californians. It would appear that people who make up a migratory group have a larger than average proportion of potential psychotics. Uncorrected figures indicate two to three times as great an incidence among immigrants as among native citizens. When the admission rate is based, however, upon the general population over fifteen years in age (immigrant groups contain few children), the foreign-born rate is only 20 per cent higher than that of natives. When further correction is made for urbanization (most immigrants live in cities), the rate becomes only 8 per cent higher. Although there are many factors complicating the total picture, it is quite possible that, with the application of more thorough statistical analysis, there will be found very little, if any, difference between the two groups.

It is widely believed, even among the medical profession, that among the Jewish people an unduly large amount of mental illness occurs. Early studies that bore this out and that have been much quoted failed to correct for the factor of urbanization.² For example, in Germany, in 1926, the incidence of mental disease among the Jewish population was one third higher than among either Catholics or Protestants. When, however, the figures are limited to the city of Berlin, the rate per 10,000 for Jews was actually lower than that of either of the two other groups (26 as contrasted with 29 and 28 per 10,000). Simi-

¹ *Ibid.*, pp. 92-97.

² *Ibid.*, pp. 97-100.

lar findings have been presented concerning Jews and non-Jews in New York City. The evidence also indicates that with respect to the old-age insanities, paresis, and the alcoholic psychoses, the Jewish group has an appreciably lower rate.

TABLE 87.—AVERAGE ANNUAL NUMBER OF NEGRO AND WHITE FIRST ADMISSIONS TO ALL INSTITUTIONS FOR MENTAL DISEASE IN NEW YORK STATE, 1929-31, EXPRESSED AS STANDARDIZED RATES PER 100,000 OF THE CORRESPONDING GENERAL POPULATION AS OF 1930*

Diagnosis	Rates per 100,000 general population		
	White	Negro	Negro-White ratio
Manic-depressive.....	13.3	20.0	1.5
Senile dementia....	27.6	52.1	1.9
Dementia praecox...	25.7	51.1	2.0
Cerebral arteriosclerosis	41.1	119.6	2.9
Alcoholic psychoses...	6.5	22.2	3.4
General paresis....	9.3	37.9	4.1
Total ..	97.4	224.7	2.3

* Landis, C., and Page, J. M., *Modern Society and Mental Disease*, p. 101, Rinehart & Company, Inc., New York, 1938.

Clear-cut statistical differences seem to exist between Negroes and Whites. A representative example of these differences is presented in Table 87. That urbanization is not a factor is evident from the fact that these differences are not reduced when the state populations outside of New York City are compared.¹ This, however, must not be taken to indicate an actual difference in susceptibility between the Negro and the White. The Negroes in New York City are migratory individuals, and we have already seen that migratory groups have more than their share of psychopathic material. The differences are, in fact, considerably reduced when we compare the incidence rate of first admissions between native New York Whites (45 per 100,000) and native New York Negroes (40 per 100,000). For immigrant whites the rate is 157, and for immigrant Negroes 186. Also, it should be remembered that Negroes, living on a lower economic scale, may not achieve hospitalization as frequently as do whites. However, the differences that have been published are too large to be argued away, and further investigation of this problem is certainly needed.

The various geographical areas of the United States show marked

¹ *Ibid.*, pp. 97-100.

differences in the incidence of hospitalized patients.¹ In New England, in 1935, for example, the rate per 10,000 for the population over fifteen years of age was 53 as compared with a rate of only 28 in the South Central states, a rate of 36 in the North Central states and a similar rate in the South Atlantic states. The rate in the Middle Atlantic states and along the Pacific coast was 43. Roughly, our seaboard states present the highest incidences, and the South Central states the lowest incidences. This is due to the larger number of available hospital beds in the industrialized and urbanized areas in our coastal districts. Many cases in the South were probably undetected or not hospitalized.

TREATMENT OF MENTAL DISEASE

In addition to such necessary precautions as are essential for physical health, such as clean living conditions, an adequate and palatable diet, exercise, rest, and medical care, certain special modes of treatment are applied to mental patients. Some of these involve the prescription of certain drugs and medicines under specified conditions (*chemotherapy*); others involve the application of certain physical principles (*physiotherapy*); and some techniques are purely psychological in nature (*psychotherapy*). The purpose of this section is to describe and evaluate some of the more prominent of these techniques. It must be remembered that treatments, while they apply the findings of experimental science, represent a clinical approach and cannot always be understood from the experimental point of view. Lacking adequate controls, when patients recover, we cannot be sure that they might not have recovered even though the treatment had not been applied. Some of these techniques are the results of many years of clinical application and are well established. Others are promising but still in the trial-and-error stage.

PSYCHOTHERAPY

A psychotherapeutic technique often used is that known as *suggestion*. This consists largely in reassuring the patient, who, not understanding his symptoms, gradually has his faith in the ability of the physician built up to the point where active cooperation is secured. In no other branch of medicine is such active cooperation as essential. Occasionally, direct *hypnosis* is resorted to as a therapeutic measure. Such suggestive measures may be direct, once rapport is established, or they may be indirect. In the latter case spectacular apparatus or procedures are used that are superficially quite convincing, though

¹ *Ibid.*, pp. 107-109.

actually useless and harmless. Here, the patient is convinced largely because of an ignorant awe of such an apparently scientific setup. To the extent that such suggestive techniques effect a reorientation of the patient's general attitude toward his life problems, they are wholesome and desirable. Unfortunately, such measures lend themselves too easily to an eradication of the symptoms rather than to an attack on the basic causative factors.

Because many mental patients are troubled with problems that they are afraid of or ashamed to face, a sincere effort is made, in talking with them, to draw them out and to get them to verbalize their basic difficulty. Such attempts are known as methods of *catharsis*. It is sometimes possible for the patient, in talking of his troubles, to make the adequate emotional response he had so long inhibited. Also, it is frequently possible for the patient to acquire an objective perspective of his condition that, through enabling him to evaluate the situation, aids in effecting a more adequate personality integration. Only after rapport has been established and the patient's reserve has been broken down and confidence obtained, can this method be applied.

In the course of treatment, an attempt may be made to train the patient to the point where he can accept life situations without experiencing the disturbing emotions (*e.g.*, fear) that have accompanied them. This is known as *desensitization*. When the treatment further consists in the building-up of adequate habits of adjustment, the process is referred to as *re-education*. Essentially, all psychotherapy is re-educative. In the functional conditions, it is frequently found that the emotional response has become a habit response. If, however, the treatment has enabled the patient to attain an objective insight into his condition, with no ill effect, such an emotional response becomes, under repetition, dulled. With the gradual disappearance of the undesirable habit, the treatment aims to introduce, as a substitute, the positive, aggressive habits of thought and action that are consonant with good mental hygiene. Obviously, the success of this depends, as it should, upon the patient's active cooperation. Also, it is evident that it presupposes a level of intelligence on the part of the patient sufficient to acquire such insight.

How successful are these techniques? They are difficult to evaluate, for, when a patient recovers, we cannot be sure that it is due to the treatment. Also, the standards for recovery vary from investigator to investigator, and it is not always possible to distinguish between various degrees of recovery. Appel¹ presents a table based upon the

¹ Appel, K. E., *Psychiatric Therapy*, in Hunt, J. McV. (Ed.), *Personality and the Behavior Disorders*, Vol. II, p. 1151, The Ronald Press Company, New York, 1944.

work of Bond and Braceland (see Table 88) that is representative of the situation before some of the newer therapies came into use. This can serve as a standard by which some of these new techniques can be evaluated.

CHEMICAL SHOCK THERAPY

The schizophrenic disorders are sometimes treated by the repeated production, usually daily, of a hypoglycemic shock in the patient by an intramuscular injection of insulin. The dosage is regulated to the patient and given in bed in the early morning. The patient feels weak and hungry, perspires quite a bit, and gradually enters a stage of progressive somnolence. He must be attended constantly. The actual coma occurs 2 to 4 hours after injection and is allowed to continue from a few minutes to an hour, depending upon the patient's

TABLE 88.—PROGNOSIS IN MENTAL DISEASE BEFORE NEWER THERAPIES WERE DEVELOPED
(Based on outcome after five years)

	No. cases	Recovered		Improved		Unimproved		No. dead	No. lost
		No.	%	No.	%	No.	%		
Dementia praecox.....	116	12	10	25	21.5	66	56.8	10	3
Manic-depressive.....	171	86	50.2	19	11.1	30	...	24	12
Paresis.....	38	13	...	8	...	5	...	12	...
Involuntional melancholia...	47	12	25.5	10	21.2	10	...	13	2
Somatic disease.....	60	22	...	8	...	3	...	23	4
Senile.....	50	2	...	4	...	8	...	31	5
Alcoholic.....	10	1	...	...	...	3	...	2	4
Psychoneuroses.....	37	21	56.7	7	16.9	4	10.8	3	2
Paranoid conditions.....	9	3	...	3	...	2	...	...	...
Unclassified.....	72	27	...	13	...	11	...	8	13
Psychopathic.....	8	...	...	4	...	2	...	1	1
Encephalitics (adult).....	8	1	...	1	...	2	...	2	2
Total.....	626	200	...	102	...	146	...	129	48
Per cent.....	100%	35%	...	18%	...	25.5%	...	22%	...

condition. It is terminated by tube or mouth feeding, depending upon the severity of the shock. The treatment should not be used with patients showing signs of myocardial damage, tuberculosis, or severe arteriosclerosis. It is based upon the theory that the schizophrenic will experience an interruption in his delusional or withdrawn thinking and may be reoriented in the process. Certainly some patients are improved, and the improvement becomes better as the treatment

continues. The effectiveness evidently depends upon how soon the treatment is begun. Malzberg's figures, as reported by Shipley and Kant,¹ were based on 1,039 insulin-treated cases and 1,039 matched noninsulin-treated controls. He reported 13 per cent recovery and 54 per cent improvement in treated cases and 3.5 per cent recovery and 19 per cent improvement among the controls. In terms of psychosis duration before treatment the figures were:

	Treated group, per cent	Control group, per cent
Up to 1 month.....	43	8
1 to 3 months.....	33	7
7 to 12 months.....	16	0
1 to 2 years.....	12	.6
3 to 5 years.....	4	.0

Metrazol-shock treatment is sometimes administered in schizophrenia and in the affective disorders in the case of severe depressions, particularly in involuntional melancholia. The treatment is given in bed. Attendants are necessary for the protection of the patient. An initial dose of 3 to 5 cc. of a 10 per cent metrazol solution is given intravenously. Within a few seconds the patient becomes bewildered and restless and experiences pronounced fear. He goes into a convulsion of the epileptiform type after which he lapses into a state of coma for several minutes. This is followed by a short period of clouded restlessness, after which he goes to sleep. Convulsions are evoked two or three times a week, the treatment continuing for from 1 to 3 months. This treatment is gradually becoming supplanted by electro-shock treatment (see below), but published figures indicate that it, like insulin-shock, has some merit. The report of Meduna and Friedman, based on 2,937 cases, as discussed by Shipley and Kant,² indicates 19.86 per cent full remissions and 38.43 per cent improved cases. Its value also depends upon how soon it is begun, for when the figures are analyzed in terms of the duration of the psychosis, they show:

Less than 6 months	60.9% recoveries	20 % improved cases
6 months to 1 year	36.8% recoveries	23.1% improved cases
Over 1 year.....	8.4% recoveries	37.7% improved cases

¹ Shipley, W. C., and Kant, F., The Insulin-shock and Metrazol Treatments of Schizophrenia, with Emphasis on Psychological Aspects, *Psychol. Bull.*, 1940, **37**, 259-284.

² *Ibid.*

ELECTRO-SHOCK THERAPY

The technique of introducing convulsions in the affective disorders by means of the electro-shock method has largely supplanted the use of metrazol in recent years. The treatment is more humane, since fatalities and complications are relatively rare and, since the patient becomes unconscious before the shock, the element of fear is minimized. Electrodes are placed on the temples and an electric current, usually not more than 600 milliamperes, is passed through the cortex for a fraction of a second. The patient becomes immediately unconscious and his body jerks into a pronounced state of tonus. Attendants are necessary to prevent dislocations or fractures. The tonic phase breaks down into a series of clonic contractures, and the seizure is usually terminated in less than a minute. The patient may awaken immediately but usually remains in a state of coma for some time. The treatment may be administered daily for several days, followed by a rest period and then a repetition of the series; or it may be given only two or three times a week for several weeks. While it seems of little effect in the schizophrenic disorders, published reports indicate that it may have merit as a treatment of the affective psychoses. This seems particularly true with respect to involutional melancholia. Dorcus and Shaffer¹ reporting on the work of Smith and coworkers summarize their findings in Table 89.

TABLE 89.—EFFECTS OF THE USE OF ELECTRO-SHOCK THERAPY

Diagnosis	No. cases	Per cent recovered	Per cent Improved	Per cent unimproved	Per cent relapsed
Involutional melancholia	20	85	15	0	5
Manic-depressive, manic	10	70	0	30	0
Manic-depressive, depressive	49	72	10	18	0
Schizophrenia. . .	16	0	7	93	0
Undiagnosed .	8	37.5	0	62.5	12.5
Psychoneurosis .	5	60	0	40	0

PREFRONTAL LOBOTOMY

Brain surgery has been applied to the treatment of the functional disorders in recent years in what may be a promising technique. The aim of the operation, known variously as prefrontal lobotomy, leucotomy, and psychosurgery, is to sever the connections between the

¹ Dorcus and Shaffer, *op. cit.*, p. 431.

thalamus and the prefrontal cortex. Freeman and Watts, who are the chief proponents in this country of the technique, believe that these connections mediate the affective component of ideational activities.¹ When the patient's condition is characterized by anxiety, depression, or agitated fearfulness, the operation is performed. It consists in the severance of the long fibers of the white matter of the cerebrum in the plane of the coronal suture anterior to the corpus callosum. As a result of the operation, it is claimed the patient loses many aspects of inhibited behavior, much anxiety and fearfulness, becomes more cheerful and comfortable, with little, if any, loss in intelligence.

TABLE 90.—RESULTS OF PREFRONTAL LOBOTOMY IN REPRESENTATIVE STUDIES

Investigators	No. of cases	Results			
		Good	Fair	Poor	Deaths
Moniz.....	20	7	7	6	0
Cohen, Noric and Ettelson	6	2	3	1	0
Strecker, Palmer, and Grant	22	11	4	2	2
Peterson and Buckstein	29	16	11	1	1
Heilbrunn and Hietko	11	0	2	7	2
Rees.....	30	9	13	6	2
Strom-Olsen, Last, Brody, and Knight	30	7	13	9	1
Dax and Smith.....	50	16	15	16	3
Cook.....	20	9	6	4	1
Kisker.....	20	6	4	7	3
Watts and Freeman.....	136	82	22	21	11
Porteus and Kepner.....	20	6	5	9	0
Schrader and Hoctor.....	207	108	39	54	6
Totals	601	282	144	143	32
Percentages.....		47	21	24	5

Differences of opinion with respect to a technique as recently advanced and radically new as prefrontal lobotomy are bound to exist. Many claims in its favor were rushed into print too soon after the performance of the operation to justify statements in terms of the permanence of its effect. A recent summary of many evaluative studies is presented in tabular form by Schrader and Robinson.² For the student's benefit, this is reproduced in Table 90.

¹ Freeman, W., and Watts, J. W., *The Frontal Lobes and Consciousness of the Self, Psychosom. Med.*, 1941, **3**, 111-119.

² Schrader, P. J., and Robinson, M. F., *An Evaluation of Prefrontal Lobotomy through Ward Behavior, J. Abnorm. Soc. Psychol.*, 1945, **40**, 61-69.

SUMMARY

Man's earliest attempts to understand abnormal behavior sprang deep from the lore of the supernatural and were couched in the language of ignorance. As people became more literate, the concepts of medical science became more widely understood and a more objective attitude was attained. Today, those who are mentally ill are considered sick. This sickness may be due to an organic lesion or a toxic condition, or may be due to faulty habit formation. Whatever the cause, it is widespread, approximately 10 per cent of our population having an expectancy of being sometime incapacitated by such conditions.

These disorders show themselves in exaggerated behavior manifestations known as symptoms. The symptoms may be disorders of sensation and perception, aberrations of motor activity, disturbances of intelligence, or changes in emotion. The most prominent of the organic psychoses are those due to alcohol, syphilis, and old age. The functional psychoses include the schizophrenic conditions, the affective disorders and the systematized delusions of the paranoid.

Mental disease occurs most frequently among older individuals, though it can occur at almost any age. Although a larger number of patients are found in urban areas, this is probably due to better diagnoses and more ample hospital facilities. Heredity seems to play an important, if not thoroughly understood, role in schizophrenia and manic-depressive conditions. Psychoses occur in decreasing frequency among individuals who are divorced, single, widowed, and married, in that order. They are noticed more frequently among men than women. The greater incidence among foreign-born immigrants is due partly to the factors of age and urbanization and partly to the fact that migratory groups apparently contain more psychopathic material. The seaboard areas of our country with better hospital facilities report a larger number of cases than other areas. We also find a greater frequency among Negroes than among Whites.

In recent years, the techniques of psychotherapy have been supplemented by chemical-shock and electro-shock methods that apparently have some merit. The art of the brain surgeon has contributed the operation of prefrontal lobotomy, which is still too new to be adequately evaluated.

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CHAPTER IX

PSYCHOLOGY IN SPEECH CORRECTION

- The Extent of Speech Disorders
 - The Extent of Corrective Procedures
- Disorders in Learning Speech
 - How Words Are Learned
 - Vocabulary Growth
 - Variations from Normal Speech Development
- Disorders of Phonation
- Disorders of Articulation
 - Vowel and Consonant Sounds
 - Lisping
 - Lolling
 - Dialects
- Disorders of Speech Rhythm
 - Heredity
 - Cerebral Dominance
 - Mental Adjustment
 - Biochemical Factors
 - Habit
- Speech Disorders Due to Defective Hearing
 - The Hard-of-hearing
 - The Deaf

Man's superior behavior over that of the lower animals is most characterized by his superiority in language, or in his ability to use a complex system of signals by which he communicates with his fellow men. In every other type of behavior, he is surpassed by some of the lower animals. Some of them are stronger than man, some are faster, some see better, some hear better, but none of them can use predicative language. To be sure, the lower animals have language of a simple interjectional nature. An animal can announce a dangerous situation, for example, but he cannot describe details. Only man, with his ability to use sentence language, can describe situations that are remote in both time and space. Only man can communicate information about events that occurred in the past and at places beyond present sensory range.

This ability to use predicated language has many values.¹ It has

¹ These values are discussed in more detail in Gray, J. S., *Psychological Foundations of Education*, Chap. 5, American Book Company, New York, 1935.

enabled man to cooperate with his fellow men and *together* they have been able to control the lower animals in spite of inferiority in speed, sensory acuity, strength, etc. Without language, cooperation is impossible. Plans and directions for regulating cooperative behavior can be communicated only by sentence language. Another value of language is in thinking. Without discussing the thesis that language *is* thinking, we can at least agree that thinking is greatly aided by language. Some people can think better if they talk aloud, some if they write, and some if they merely speak implicitly to themselves. Without language of any sort, it would be impossible to communicate the results of thinking to others, assuming that it could take place at all. A third value of language is the pleasure of its use. Language is a delightful form of behavior—whether spoken or written. The poet enjoys expressing himself in poetry, while the lady across the street enjoys expressing herself to anyone who will listen. As Jespersen¹ says, language is “an instrument that one loves to play on.”

In this chapter, however, we are interested in that form of language, known as speech, that can be produced without the use of tools. It may be gesture (including the sign-speech of the deaf) but it usually is vocal in nature. The signals are produced by the speaker manipulating certain parts of his own body. Gestures are made by the hands, face, head, etc., and are used to communicate feeling-tone or emotional attitude, while voice is made by the breath, larynx, jaws, tongue, lips, etc., and is used to communicate ideas. In comparison with other types of behavior, vocal speech is very rapid and requires precision movements of a large number of very delicate muscles. No other behavior is so exacting and necessitates such fine muscular coordination. Obviously then, some people whose neuromuscular endowment is somewhat limited will develop difficulties in the use of speech. Some will be unable to learn it readily, while others will acquire difficulties in its control after learning. Because these speech difficulties are behavior problems, they have been widely studied by the psychologists. The following pages review some of this research.

THE EXTENT OF SPEECH DISORDERS

Perhaps the most outstanding, and certainly the most quoted, survey of the extent of speech problems was made by the Federal government in 1931.² The data were collected from 48 cities with

¹ Jespersen, O., *Language, Its Nature, Development and Origin*, Henry Holt and Company, Inc., New York, 1922.

² White House Conference on Child Health and Protection, *Special Education, The Handicapped and the Gifted*, D. Appleton-Century Company, Inc., New York, 1931.

more than 10,000 population each. The percentage of school children with speech defects in these cities ranged from 1 to 21.4 per cent (the mean was 6.9). "There are in America 1,000,000 school children between the ages of five and eighteen so defective in speech as to require remedial treatment and training." This number does not include those who stopped their schooling before reaching eighteen, nor those who may have been in special schools for speech defectives. The relative frequency with which the various speech defects were distributed in this report is shown in Table 91.

TABLE 91.—RELATIVE FREQUENCY OF SPEECH DEFECTS IN EACH 10,000 CASES
(White House Conference data)

Disorders	Frequencies
Oral inactivity.....	4,851
Articulatory disorders (structural).....	1,059
Stuttering.....	1,029
Sound substitution.....	1,014.3
Voice disorders (functional).....	1,014.3
Dilectal.....	470.4
Voice disorders (structural).....	441
Articulatory disorders (paralytic).....	58.8
Aphasic disorders.....	29.4
"Hard of hearing" speech.....	14.7
Voice disorders (paralytic).....	14.7

Wallin¹ investigated the frequency of speech defects in the St. Louis city schools. He found 1,662 mild speech defects and 519 of a more severe nature. This represented 2.8 per cent of the entire school population. He found that 3.6 per cent (1,612) of the boys had defects, while only 2 per cent (924) of the girls had defects. Also, he found that almost twice as many (4.9 per cent) left-handed children had speech defects as did those who were right-handed. The distribution of the defects was as follows: lisping—1,448 cases, or 1.6 per cent; stuttering—683 cases, or .7 per cent; all other defects—405 cases, or .4 per cent.

A later survey of speech defectives was made of the school children of South Dakota by Root.² He found more than twice as high a percentage as did Wallin. No doubt the difference is due to different conceptions of normal speech. Root's results are shown in Tables 92 and 93. Note that the frequency of speech defects declines with

¹ Wallin, J. E. W., *A Census of Speech Defectives among 89,057 Public School Pupils, Sch. & Soc.*, 1916, 3, 213-216.

² Root, A. R., *A Survey of Speech Defects in South Dakota, Elem. Sch. J.*, 1926, 26, 531-541.

the years of schooling and that boys have more defects than girls. The ratio is about the same as found by Wallin.

TABLE 92.—DISTRIBUTION OF SPEECH DEFECTS (IN SOUTH DAKOTA) BY SCHOOL GRADES

Grade	Per cent of defects	Months defectives are retarded	Ratio of defects in boys and girls
1	9.3	.0	1.8 to 1
2	7.5	8.6	1.3 to 1
3	5.6	9.6	1.0 to 1
4	6.4	11.2	1.8 to 1
5	6.	8.6	1.3 to 1
6	4.9	11.2	2.4 to 1
7	4.1	10.1	1.8 to 1
8	4.	10.7	1.0 to 1
Mean	6.3		1.5 to 1

TABLE 93.—RELATIVE FREQUENCY OF VARIOUS SPEECH DEFECTS (IN SOUTH DAKOTA)

Defect	Per cent of all pupils	Per cent of speech defectives	Months defectives are retarded	Ratio of defects in boys and girls
Stuttering.....	1.2	19	8.55	2.2 to 1
Lisping	2.6	41.2	10.22	1.1 to 1
Thick speech....	.8	12.7	16.29	1.4 to 1
Indistinct speech.....	.2		20.65	2.5 to 1
Mutism and nasality.....	.2	6.3	9.98	1.2 to 1

Rogers¹ reports the relative frequency of various speech defects in two large city school systems, New York and Philadelphia. This is shown in Table 94. The discrepancy between the two cities is due, perhaps, to different conceptions of what constitutes a speech problem. For example, stuttering accounts for 23 per cent of all speech defects in New York but for only 7 per cent in Philadelphia. In Detroit it was found that 13 per cent of speech defectives were stutterers, while in Cleveland it was 24 per cent. Since there are no reputable speech tests, the seriousness and type of speech defects are matters of opinion.

Stinchfield² used the Blanton-Stinchfield speech measurement test to survey the speech of 2,864 entering college freshmen over

¹ Rogers, J. F., *The Speech Defective School Child*, U.S. Bur. Educ. Bull., 7, 1931.

² Stinchfield, S. M., *Speech Disorders*, Harcourt, Brace and Company, New York, 1933.

a period of 10 years (1922-1932). This is perhaps the most careful speech survey yet reported. She found 382 students (13.33 per cent) with speech defects serious enough to be placed in a special class for speech correction. The relative incidence of the various speech disorders is shown in Table 95.

TABLE 94.—PERCENTAGE OF VARIOUS SPEECH DEFECTS IN TWO LARGE CITIES

Defect	New York	Philadelphia
Lisping	51	33
Stuttering	23	7
Foreign accent	2.5	18
Nasality	1.2	4
Lolling	3	1
Bad phonation	14	
Baby talk .....	....	28
No resonance .....	....	2
Harshness .....	....	2
Other defects	5	5

TABLE 95.—INCIDENCE OF SPEECH DEFECTS FOUND IN 2,864 COLLEGE FRESHMEN

Speech defect	Number	Per cent of defective group	Per cent of student body
Oral inaccuracy, letter substitution	145	38	5.1
Lisping	77	20	2.68
Vocal defect (nasality, hoarseness, etc.)	65	17	2.27
Stuttering (including cluttering)	37	10	1.28
Miscellaneous (dialects, infantile paralysis) ..	58	15	2

Blanton¹ made an interesting study of the speech defects of school children in Madison, Wisconsin. He found that 5.69 per cent of the children have speech defects of some kind, but only .72 per cent of them stutter. He found that the defects decrease from 11.05 per cent in the first grade to 2.65 per cent in the eighth. This agrees with Wallin's study quoted above. Curiously though, Blanton found that fewer kindergarten children have defects (6.4 per cent) than first graders.

Carhart² surveyed 405 schools in Illinois and found that "more than 20 per cent" of the 144,570 pupils represented have articulatory,

¹ Blanton, S., A Survey of Speech Defects, *J. Educ. Psychol.*, 1916, 7, 781-792.

² Carhart, R., A Survey of Speech Defects in Illinois, *J. Speech Disorders*, 1939, 4, 61-70.

voice, or rhythmic difficulties of speech. Louttit and Halls¹ found only 3.7 per cent of the children in the schools of Indiana with speech defects. Burden² found slightly fewer serious speech defects in the Indianapolis schools (2.9 per cent) but estimates that perhaps one third of the children in the primary grades need corrective speech work. Voelker³ found that 12 to 18 per cent of the students of a liberal arts college need corrective speech attention.

THE EXTENT OF CORRECTIVE PROCEDURES

It is now obvious that the speech correction problem is more extensive than indicated by the attempts often made to solve it. While some cities have employed trained speech correctionists to help these afflicted children, others have made no provision whatever to help them. Even the cities employing speech correction teachers often give them such large numbers of defectives to train that their efforts are futile. Table 96 is made up of data taken from a publication of the Office of Education in Washington.⁴ These data are selected from the reports of 144 city school systems with 438 specially trained speech-correction teachers on their staffs. There are 126,146 children with speech defects in these cities. This averages 288 children per teacher. (Note the variations from this, however, in the table.) Even if a teacher should hold but one lesson per week for each pupil in classes of 10, she would have a large teaching load. How teachers with twice this load can be of much assistance to children with speech defects is difficult to understand.

It is obvious that there is a great need for teachers with special training in speech disorders. This training is afforded at many colleges and universities where speech clinics are located and prospective teachers work with speech defectives under expert supervision. In some places this training is given in the English and speech departments, but most often it is given in the psychology department. Here research, similar to that reviewed in this chapter, is constantly being performed so that the prospective speech teacher develops a research attitude toward his pupils. Then, national

¹Louttit, C. M., and Halls, E. C., *The Indiana Speech Survey, Indiana Teacher*, 1936, **80**, 26.

²Burden, L. G., *A Survey of Speech Defectives in the Indianapolis Primary Grades, J. Speech Disorders*, 1940, **5**, 247-258.

³Voelker, C. H., *Two Surveys of Defective Speech in a Cultural College, J. Amer. Ass. Colleg. Registr.*, 1938, **14**, 39-42.

⁴Martens, E. H., and Foster, E. M., *Statistics of Special Schools and Classes for Exceptional Children, 1939-1940, U.S. Off. Educ. Bull.*, 1942.

conferences on speech correction are held in conjunction with the American Psychological Association, the National Association of Teachers of Speech, and the American Speech Correction Association. However, as indicated in Table 96, there is still great need for well-trained speech correctionists. Too often the speech correction

TABLE 96.—NUMBER OF SPEECH DEFECTIVE CHILDREN AND PROVISION FOR THEIR REHABILITATION IN CERTAIN AMERICAN CITIES

City	Number of defectives	Number of teachers	Pupils per teacher
Population over 100,000:			
Los Angeles.....	3,662	17	215
San Francisco.....	2,247	7	321
Denver.....	1,025	2	514
Washington, D.C.....	3,321	9	369
Chicago.....	5,330	23	232
Indianapolis.....	504	1	504
Louisville.....	364	1	364
New Orleans.....	3,250	6	541
Baltimore.....	1,260	8	157
Boston.....	3,613	23	157
Detroit.....	7,868	38	207
Minneapolis.....	1,586	12	132
St. Louis.....	1,931	10	193
Buffalo.....	4,584	9.5	482
New York.....	27,153	38	714
Philadelphia.....	7,708	26	296
Pittsburgh.....	4,566	6	761
Salt Lake City.....	324	1	324
Seattle.....	605	4	151
Milwaukee.....	2,342	6	390
Population under 100,000:			
Stockton (Calif.).....	227	1	227
Kokomo (Ind.).....	305	1	305
Dubuque (Iowa).....	65	5	13
Lansing (Mich.).....	18	1	18
Butte (Mont.).....	300	1	300
Schenectady.....	1,413	1	1,413
Johnstown (Pa.).....	558	1	558
Waco (Tex.).....	10	1	10
Roanoke (Va.).....	206	1	206
Holland (Mich.).....	160	1	160
Mankato (Minn.).....	168	1	168
Manitowoc (Wis.).....	277	2	138
Redwood (Calif.).....	253	1	253
Caldwell (Idaho).....	5	1	5
Beaver Dam (Wis.).....	121	1	121

teacher is improperly trained. He takes a few courses in public speaking and then poses as an authority in all phases of speech and language. Speech correction should be attempted only by those who have been trained at reputable institutions. Quackery in this field is especially deplorable.

The success of speech corrective work on 16,213 cases is reported by Rogers¹ and shown in Table 97. It is obvious that the correction

TABLE 97.—PERCENTAGE OF EFFECTIVENESS IN 16,213 SPEECH CORRECTION CASES

Speech Defect	Corrected	Improved
Stuttering.....	27	60
Lolling ..	36 5	4.8
Lisping	35	55
Defective phonation.....	50	40
Foreign accent.....	30	60
Dialect.....	30	66
Nasality.....	21	42
Others....	6	40

of speech disorders is a difficult matter. It is estimated by one speech authority that improperly trained correctionists do patients about as much harm as they do good. The fact that a person is the head of a school for speech correction, or that he is a physician on the staff of some hospital, or that he is a professor in a university, is not evidence that he is a qualified speech correctionist.

If, as estimated above, there are 1 million school children in the United States with speech disorders and if a speech teacher can direct the correction of 250 cases at one time, simple arithmetic indicates that we need 4,000 speech correction teachers. Since membership in the American Speech Correction Association is less than 500, and this is perhaps a near accurate indication of *qualified* correctionists, it is obvious that children with this handicap are being unfairly neglected. We have special institutions and spend millions of dollars, and rightly so, on children with other types of defects (such as deafness, blindness, etc.) while speech defects are too often ignored completely.

DISORDERS IN LEARNING SPEECH

We have defined speech as an organized, or systematized, group of symbols used for the purpose of communicating ideas and feelings to other people. These symbols are conditioned stimuli that are

¹ Rogers, J. F., *The Speech Defective School Child*, U.S. Bur. Educ. Bull., 7, 1931.

learned, like any other conditioned stimuli, by being associated with natural or unconditioned stimuli (see discussion of the conditioned response in Chap. 1).

When the child is born he uses the muscles of his body in a random fashion. There is not much control nor coordination. We say that he makes random movements. As he matures, he learns to control his muscles and his behavior becomes more intentional. His fists no longer punch him in the face by accident and he can reach for an object without having his hand go somewhere else. He has learned a degree of muscular control and coordination.

HOW WORDS ARE LEARNED

The same procedure of development occurs in the child's speech muscles. At first, there are random movements producing random sounds or babbling. These slowly give way to controlled movements and controlled sounds. The child reaches a stage in maturation when he can make a desired sound rather than some other unintentional one. He is then, and only then, ready to learn language. Up until now, all babies are alike. The Japanese, the Indian, the Eskimo, the English, the French, the Greek children—all make the same pre-language sounds. It is estimated that the normal child makes every possible sound sometime during his prelanguage babbling. Certainly he makes all the sounds that are later preserved for language purposes.

As Allport¹ explains, "The chief significance of the vocal play of babies seems to be in establishing circular reflexes between the sound of the syllable and the response of speaking it." This means that the child may say "da" by accident, but he *hears* the sound as well as *feels* the muscles used in its production. After a few random repetitions, the hearing of the sound becomes the stimulus for the muscular action of producing it and a conditioned response is formed. After that, another person may say "da" and the child responds by the muscular action that produces "da." The child can now make a particular sound in response to particular stimulation. Random behavior has now become localized and the child is ready for the next stage of speech development.

After the child has learned to make specific sounds and to recognize these sounds when they are made by others, he next learns what they mean or what they stand for. This again is a conditioned response. Suppose, for example, that a parent says "da" only when a particular object, let us say a ball, is present. He says "da" as he hands the

¹ Allport, F. H., *Social Psychology*, Chap. 8, Houghton Mifflin Company, Boston, 1924.

child the ball. This stimulates the child to say "da" as he grasps the ball. The ball and "da" are experienced together. Soon the ball alone will stimulate the muscular action of producing the sound "da" and likewise the sound "da" will stimulate the manipulative reactions to the ball. Each becomes a symbol or a substitute stimulus for the other.

Now suppose that the child utters the sound "da" some day when the ball is not present. The mother hears this and immediately produces the ball. After this is repeated a few times, the child learns, again by the conditioned response process, that the sound "da" can be used to bring about a specific reaction in another person. "Da" is now a sound that he can make to cause the mother to get the ball for him. He now has learned language.

Thus words are first made by accident, or as a result of random muscle movement. With maturation and learning, they are next repeated by intention, or as the specific reaction to specific stimulation. Finally, they are uttered to produce a specific reaction in others. They are used to communicate ideas and feelings and wants and aversions. They are tools for human cooperation.

VOCABULARY GROWTH

The increase in words or vocabulary of children has been carefully studied. Many authorities consider vocabulary growth to be an excellent indication of mental development. While there are wide individual differences even among normal children, due to environmental variations, it has been found that when the environmental factor is constant an inferiority in vocabulary is a fairly reliable indication of inferiority in mental development.

Smith¹ found that the average child of one year has a vocabulary of only three words, but at the age of six it has increased to more than 2,500 words. His results are shown in Table 98.

TABLE 98.—INCREASE IN VOCABULARY WITH AGE

Age	Number	Words	Gain
1	52	3	3
2	25	272	269
3	20	896	624
4	26	1540	644
5	20	2072	532
6	9	2562	490

¹ Smith, M. E., *An Investigation of the Development of the Sentence and the Extent of Vocabulary in Young Children*, *Univ. Iowa Stud. Psych.*, 1926, Vol. 3, No. 5.

Buckingham and Dolch¹ give an estimated vocabulary for children at each school grade. This is shown in Table 99. The age six vocabulary, or the beginning of grade 1, is somewhat lower than that found by Smith, but the average I.Q. of the 9 six-year-olds in the Smith study was 108.

TABLE 99.—ESTIMATED VOCABULARY OF SCHOOL CHILDREN

	Words	Increase
Beginning of grade 1...	2,000	
Beginning of grade 2...	2,800	800
Beginning of grade 3.....	3,600	800
Beginning of grade 4.....	4,500	900
Beginning of grade 5.....	5,400	900
Beginning of grade 6.....	6,400	1,000
Beginning of grade 7.....	7,500	1,100
Beginning of grade 8.....	8,700	1,200
End of grade 8.....	10,000	1,300

McCarthy² studied the development of the various parts of speech in the language of 20 preschool children. She found that nouns predominate in the early years but they are gradually supplanted by other parts of speech as age increases. Her results are shown in Table 100.

Soon after the child has learned to use single words to communicate his wants to others, he begins to use word combinations. He usually begins with a noun and a verb. For example, he says, "me go," or "doll lost," or "Daddy come," or "doggie bark," or "finger hurt." These simple noun-verb sentences are soon followed by more complex combinations using all the other parts of speech (as indicated in Table 100). Also, sentences become longer. Table 101 gives the average sentence length for both sexes, at various ages up to five years, as found in the studies of Smith and McCarthy.³ Note that all these studies of language indicate the superiority of girls over boys at these early ages.

VARIATIONS FROM NORMAL SPEECH DEVELOPMENT

Now, what is the significance of variation either above or below the normal pattern of speech development? First, such variations may indicate corresponding variations in intelligence. There are exceptions, but, in general, the child who is superior in speech development is also

¹ Buckingham, B. R., and Dolch, E. W., *A Combined Word List*, Ginn and Company, Boston, 1936.

² McCarthy, D., *The Language Development of the Pre-school Child*, University of Minneapolis Press, Minneapolis, 1930.

³ See footnotes above.

TABLE 100.—PERCENTAGE OF EACH PART OF SPEECH USED AT VARIOUS AGES

Part of speech	Age in years	Sex		
		Male	Female	Both
Nouns.....	1.5	43.6	51.5	50
	3	23.6	23.2	23.4
	4.5	19.4	19.3	19.3
Verbs.....	1.5	16.7	13.1	13.9
	3	23.5	22.5	23
	4.5	25	25.3	25.1
Adjectives.....	1.5	5.1	10.7	9.6
	3	15.4	16.7	16.1
	4.5	14.4	16.1	15.2
Adverbs	1.5	5.1	8.5	7.9
	3	7.8	6.3	7
	4.5	7.7	6.3	7
Pronouns.....	1.5	12.8	9.8	10.3
	3	21.3	17.3	19.2
	4.5	21.1	19.1	20.5
Conjunctions	1.5	0	.6	.5
	3	1.1	3.7	2.4
	4.5	4	3.5	3.8
Prepositions... ..	1.5	0	0	0
	3	5.4	8.4	6.9
	4.5	6.7	7.6	7.1
Interjections	1.5	16.7	5.5	7.6
	3	1.5	1.5	1.5
	4.5	.9	1.4	1.2

TABLE 101.—AVERAGE NUMBER OF WORDS PER SENTENCE

Age in months	Smith's study			McCarthy's study		
	Male	Female	Both	Male	Female	Both
18				1	1.3	1.2
24	1.9	2.4	1.7	1.4	2.1	1.8
30			2.4	3.2	3.1	3.1
36	3.5	3.1	3.3	3.1	3.8	3.4
42			4	4.2	4.4	4.3
48	3.4	4.5	4.3	4.3	4.4	4.4
54			4.7	4.6	4.7	4.6
60	4.8	4.5	4.6			

superior in mental development. Likewise, although there are many exceptions, the child who is slow in speech development is likely to be mentally retarded. Terman¹ reports that while speech begins in the child of superior mental ability at 12 months, it does not begin until 15.8 months in the child of average mentality, and not until 34.4 months in the feeble-minded child. McCarthy² found that both the total number of words the child used, or the amount of his talking, and the number of different words used, or the size of his vocabulary, were positively correlated with the child's intelligence. These results are shown in Table 102.

TABLE 102.—THE RELATION OF MENTAL AGE TO MEAN NUMBER OF WORDS USED AND MEAN NUMBER OF DIFFERENT WORDS USED

Mental age	Mean number words used		Mean number different words used	
	Male	Female	Male	Female
1.5	9.6	29.3	3	8.7
2	46.5	60.3	15.3	11.6
2.5	112.9	124.6	21.6	18.4
3	169.8	207.7	28.6	45.2
3.5	173.4	181.4	37.1	35
4	228.7	198.4	48.2	42.9
4.5	239.2	266.8	46.7	49
5	234	235.3	50.2	71.7
5.5	231	244.8	87	67

Second, variations from normal speech development may merely indicate that the child is not maturing in all his traits in a uniform manner. Few children follow the same pattern of development in all traits. If a child is slow in speech development and apparently normal in other respects, he should not be urged to improve his speech. Leave him alone and let nature take its course. Urging will be of no value and it may create a social adjustment problem that is harmful. Some speech correction authorities insist that few speech problems should be considered as such until the child is at least five years old. Normal maturation often takes care of what at one stage in the child's development seems to be a serious speech disorder.

DISORDERS OF PHONATION

"Contrary to popular opinion, caused perhaps by the misleading name, the voice is produced not by the vibration of cords but of bands.

¹ Terman, L. M., *Genetic Studies of Genius*, Vol. I, Stanford University Press, Stanford University, Calif., 1925.

² McCarthy, *op. cit.*

The voice producing vibrators are two flat pieces of muscular cartilage extending out from the walls of the larynx or 'Adam's apple.' Both ends and one side are attached to the larynx so that only one side is free to vibrate. If a flat piece of rubber is tied across the end of a tin can, and then a slit made through the middle of it, we have an analogy to the vocal vibrators in action. In ordinary breathing they relax and leave a wide air passage, but when in vibration they come very close together with only a narrow slit between.

"Pitch in sound depends on the number of vibrations per second. Change in the length or the thickness or the tensity of a vibrator will cause a change in pitch. . . . Vocal pitch is changed by activity of the vocal muscles, which are attached to the vocal bands. They can change the length, the thickness and the tensity of the bands, thus giving them a wide pitch range.

"Resonance is the reenforcement of the fundamental tone, produced by the vibrator, with the sympathetic vibrations of other agents. The sound board on a piano, the pipes on a pipe organ, the body of a violin, are examples of resonance agents. Their sympathetic vibrations add quality to the fundamental tone. The bones and cartilages of the chest, the neck, and the head, all send out sympathetic vibrations as does the piano sound board. Place the hand on the chest and speak in a low tone. Immediately you feel sympathetic vibrations. The air cavities of the chest and head likewise produce sympathetic vibrations which reenforce the fundamental sound of the vocal bands. These reenforcements make the voice much stronger and more pleasing than it would be if it came directly from the larynx without resonance.

"Vocal force, or loudness, is caused by wider vibrations of the vocal bands brought about by greater breath pressure. Breath pressure is caused by greater and more powerful contraction of the muscles which force the air out of the lungs. In proper diaphragmatic breathing, these are the abdominal muscles. They contract, pushing the abdominal organs up against the diaphragm which becomes more arched into the chest cavity, and thus forces the air out. Observe a dog barking and notice the action of his abdominal muscles. The loudness of his bark will depend upon the force of contraction of those muscles. Thus, the degree of vocal force depends on the degree of contraction of the abdominal muscles."¹

It is now obvious that disorders of phonation are all in some manner associated with these three characteristics of the voice—pitch, resonance (or quality), and loudness.

¹ The above quotation concerning phonation is taken from Gray, J. Stanley, *Communicative Speaking*, Expression Company, Boston, 1928.

Disorders of pitch are associated either with the vocal bands directly or with the muscles that control them. Often the vibrating edges of the vocal bands become irregular. This causes a hoarse voice and is very noticeable after football games. Often auctioneers, public speakers, and newsboys, speak with a pinched throat and thus become hoarse. More muscles than necessary are contracting to position the vocal bands for producing the desired pitch. The bands may be pulled so close together that they interfere with each other in vibration. This causes the edges to become cracked and then swollen. The remedy for this condition is to speak with a minimum of muscular effort in the larynx. The speaker must learn to relax all laryngeal muscles except those necessary to produce the desired pitch. Directions for relaxation discussed in Chap. II are appropriate for use here.

Another common disorder of pitch is the lack of variation, or speaking in a mono-key. When the mono-key is unusually high the voice is especially displeasing. "The high piercing tones of my neighbor who at this moment is screeching, 'Ma-r-ec!' prompts me to put the error of too high a pitch at the top of the list. Marie now has answered, 'I'm coming; can-tcha hea-r-rrr?' in unconscious mimicry of her mother. The pitch is not only inappropriate to the age and sex of the individual; it is inappropriate to anything called human. The tensions in extrinsic as well as intrinsic muscles of the neck and larynx have become a fixed habit in the mother and become as well the general bodily configuration of nervous excitability and strain. Through imitation Marie is certain to be known as the girl with the 'squeaky voice.'"¹

Fortunately, most problems of pitch control respond readily to corrective procedures. The books listed at the end of this chapter describe these in detail.

Disorders of resonance are usually due either to malformations in the resonance mechanisms (such as adenoids, cleft palate, enlarged tonsils), or to maladjustments in voice production. Remedy of the first type of difficulty is obviously surgical attention. However, remedy of maladjustments in voice production depends on the nature of the maladjustment. "There are three kinds of maladjustment which produce three characteristic kinds of impure quality in the voice.

"First, there may be unnecessary contraction or tensing in the muscles of the throat, causing characteristic 'throaty' quality." The remedy is proper relaxation, which can best be attained by the procedure outlined in Chap. II. "The second type of maladjustment

¹ Quoted from Berry, M. F., and Eisensohn, J., *The Defective in Speech*, p. 158, F. S. Crofts & Co., New York, 1942.

is 'voice misplacement' or misdirection. As the voice comes up from the vibrators, it should be directed against the hard palate, just back of the upper front teeth. This is the bony part of the mouth roof and reflects the sound out of the mouth. If it is directed further back it hits the soft palate and loses much of its force. This part of the mouth roof is soft and deadens sound, just as velvet curtains do. . . . The third type of maladjustment is lack of breath conservation. The use of too much breath gives a 'breathy tone' which is always hard to hear. Hold a mirror close to the mouth and try to speak so that moisture does not collect on the mirror. Do not try to increase the capacity of the lungs. Remember that the only function of breath in voice production is to cause the vibration of the vocal bands."¹

Disorders of loudness are almost always associated with faulty breath control. "Voice can be produced only by outgoing breath. Consequently, in continuous talking the inspiration must be quick so the talk will not be broken, and the expiration economized so the talk will be continuous. In other words, the speaker must spend a minimum of time in breathing in and a maximum of time in breathing out. This requires that the breathing muscles be well developed and well controlled." These are the muscles of the diaphragm, an arched partition between the lung cavity and the abdominal cavity. This may "be pulled downward by contracting the fan-shaped muscles which are attached to the walls of the body and spread out over the diaphragm. This action forms a vacuum in the lower part of the chest where the lungs have greatest capacity. There is no weight to press on them and hasten expiration, as in the case of shoulder breathing. The expansion comes where there is least limitation. These muscles are used for no other purpose and evidently were intended by nature to be used for breathing. They are very powerful and easily controlled.

"The diaphragm method of breathing can be developed with practice. Lie down on a bed and completely relax. Notice that breathing now seems to center in the abdominal region below the chest cavity. This is because the diaphragm is arched upward, and when pulled down to increase the capacity of the chest it presses on the abdominal organs. These in turn, push the abdominal walls outward. Expansion in the abdominal region is a test of proper diaphragm breathing. Now, stand up and try to breath in the same way. Learn to read and speak while breathing properly. Learn first while lying down, and then go through the same process while standing."²

¹ Quoted from Gray, *op. cit.*

² *Ibid.*

Mastery of diaphragm breathing will soon take care of all ordinary disorders of loudness.

A fourth disorder of phonation is *aphonia*, or loss of voice. This may be due to congestion in the larynx, as with a bad cold, or to psychological reasons (hysteria) that cannot be discussed here. The remedy must, of course, depend on the cause.

DISORDERS OF ARTICULATION

When vocal sound leaves the phonation mechanism in the larynx it moves with the breath to the oral and nasal cavities where it is modified by the soft palate, the tongue, the teeth, and the lips into words, or speech. Voice is the raw product out of which speech is made. The process of converting voice into speech is called *articulation*.

VOWEL AND CONSONANT SOUNDS

There are two classifications of elementary speech sounds—vowels and consonants. The vowel sounds, or continuants, are made by altering the voice passageway without interfering with or interrupting the voice passage. Vowels are continuous in flow and made by positioning the organs of articulation, especially the tongue and lips. On the other hand, consonant sounds are made by regulating the free escape of the voice. This is done by contact, or near contact, of the soft palate, the tongue, the teeth, and the lips across the voice passageway. Some consonants (v, f, l, w, h, s, and r) are “open” and made by the voice or breath passing through the mouth or nose with no complete stoppage. Some (b, d, g, p, t, and k) are “explosive” and made by the complete interruption of the voice passage and then its sudden release. Three (m, n, and ng) are made in the nasal cavity.

In general, all articulation disorders center around the formation of vowels and consonants. The vowel disorders are due either to an inadequate passageway for the voice sound or to an improper position of the tongue and lips for forming the desired sound. However, vowel sounds are comparatively easy to make and cause the average speaker but little difficulty. If the phonation itself is not defective in pitch, resonance, or strength, it is easy to learn to place the tongue and lips in proper positions for making the various vowel sounds.

The proper formation of consonant sounds is not so easy. Most consonant sounds are hard to make and necessitate very precise and prompt action of the muscles of the palate, tongue, jaw, and lips. Few other muscles in the body must be so well trained and well controlled.

Consonant sounds vary greatly in the frequency with which they

appear in spoken language. Travis¹ checked more than 46,000 sounds in the speech of children, university adults, and common laborers. He found that the four consonant sounds made most frequently by children (t, n, r, and s) are made most frequently by adults. Also, the four sounds made least frequently by children (sh, ch, j, and wh) are made least frequently by adults (see Table 103 for these results).

TABLE 103.—RELATIVE FREQUENCY OF CONSONANT SOUNDS IN THE CONVERSATIONAL SPEECH OF CHILDREN AND ADULTS

Sound	Frequencies in per cent		
	Children	University adults	Common labor adults
t (to).....	12	13.4	12.5
n (no).....	10.4	10.3	10.8
r (ride).....	9.3	8.8	8.8
s (see).....	8.9	7.4	7.2
l (lady).....	6.3	6	5.5
d (do).....	6.3	7	6.8
m (me).....	5.2	4.9	6.8
k (kite).....	5.1	4.8	5.4
z (zero).....	4.3	4	3.6
w (we).....	4.2	4.3	4.6
th (these).....	4	4.3	4.5
h (he).....	3.9	4.2	4.3
b (be)	2.9	2.6	2.8
p (pail).....	2.8	2.3	2
g (go)	2.7	2.5	2.5
f (fight).....	2.4	2.7	2.7
v (vine)	2.4	2.6	2.6
ng (ring).....	1.9	1.9	1.9
y (yes)	1.7	2.4	2.1
sh (she)	1.3	1.6	1.4
ch (church).....	.7	.6	.9
j (joy) .....	.7	.7	.6
wh (white) .....	.6	5	3

Lisping is a common articulation disorder in which the patient substitutes the sound th for the sound s. It may be due to bad front-teeth formation, or to inactive muscles in the tip of the tongue, or to a bad habit. Malformation of the incisors can usually be corrected by dental attention. The inactive genioglossus muscle and the bad habit can both be corrected by exercise. Any book on speech correction contains exercises for remedying this sound substitution.

¹ Travis, R. C., *Speech Pathology*, D. Appleton-Century Company, Inc., New York, 1931.

Lolling is a speech disorder characterized by articulatory inactivity. The tongue, especially, is too slow, and the speech is thick and unfinished. The sounds r, l, t, d, k, and g are especially indistinct. Lolling is often due to deficient mentality, but muscular incoordination resulting from a childhood disease and defectively formed speech organs (such as short frenum, large tongue, defective nerve control) may cause such lazy speech. Exercises are essential, but the correction is a long slow process and sometimes impossible.

Dialects constitute a large percentage of speech defects. Foreign dialects are difficult because many English speech sounds are not found in some other languages. Provincial dialects are not considered very important unless they represent a lower socioeconomic status. A Bostonian dialect is not usually a problem for the speech correctionist, but an East Side dialect, or a Texas drawl or "Minnesota skol talk" are all speech problems. The remedy for any sort of a dialect is to determine which sounds are difficult and then drill on those alone and in combination with other sounds. The remedy is corrective practice.

Borden and Busse¹ list five characteristics of foreign dialect.

1. Sound unit substitutions
2. Sound unit additions
3. Sound unit omissions
4. Misplaced stress
5. Incorrect intonation.

The first three of these characteristics are also found in provincial dialect along with two others.

4. Inversions of properly occurring sound unit sequences—preform for perform, calvary for cavalry, etc.
5. Defective tone quality.

The same authors give four rules for correcting dialects that are worthy of repetition.

1. Make the patient acutely conscious of the acoustic difference between the standard sound that he should produce and the defective sound that he does produce.
2. Develop in the patient a clear visual image of the adjustment that his speech mechanism must make for the production of the new sound.
3. Develop in the patient a muscular control necessary for the production of the new sound.
4. Develop the patient's tentative and uncertain production of the new sound into a firmly rooted speech habit.

¹ Borden, R. C., and Busse, A. C., *Speech Correction*, F. S. Crofts & Co., New York, 1925.

DISORDERS OF SPEECH RHYTHM (STUTTERING)

Rhythm is just as important in speech as in any other type of behavior. Those who are unable to speak rhythmically are said to "stutter." Due to intense excitement, or to physical fatigue, or to prolonged anxiety, anyone may stutter. Most children go through a stuttering stage before their speech habits are well established. But some people habitually experience intense muscular cramps and spasms when they try to speak. They may repeat the initial sound of a word over and over again, or they may experience a complete sound blockage and for a time are unable to make any sound at all. At any rate, the rhythm of speaking is definitely blocked.

There are a number of facts concerning stuttering that most authorities accept because they have been established by research methods.

1. There are about 1,400,000 stutterers in the United States, or approximately 1 per cent of the population stutters.

2. The stutterer can speak normally on some occasions. This indicates that his trouble is not a defect in structure but a defect in function. There is neuromuscular incoordination, hypertension, and, usually, emotional disturbance.

3. Stuttering occurs from three to five times as often among boys as among girls.¹

4. There is no relation between mental ability and stuttering, although this handicap does cause an average school retardation of about one year.²

5. There are three age peaks at which stuttering begins (a) the language learning age, two to four years old; (b) the starting-to-school

¹ West reports in A Symposium on Stuttering, that the White House Conference on Child Health, of which he was chairman of the committee on speech, found that boys exceeded girls in speech defects as follows:

Grade 1.....	3.1 to 1
Grade 2.....	3.4 to 1
Grade 3.....	3.6 to 1
Grade 4.....	4.2 to 1
Grade 5.....	4.2 to 1
Grade 6.....	4 to 1
Grade 7.....	4.8 to 1
Grade 8.....	3.7 to 1
Grade 9 and 10.....	3.7 to 1
Grade 11 and 12.....	5.5 to 1

² Evidence for this statement is found in studies by Travis, West, and Wallin. Louttit has summarized these data in his book *Clinical Psychology*, Harper &

age, six to seven years old; (c) the puberty age, twelve to fourteen years old.

6. Other neuromuscular functions, especially breathing, may be included in the stuttering spasm syndrome. Even when not speaking, stutterers do not usually have proper breathing rhythm. The ratio of inspiration time to expiration time is considerably less with stutterers than with nonstutterers.¹

HEREDITY

It is a generally accepted fact that stuttering runs in some families. However, whether it is due to heredity, or to habits learned from

Brothers, New York, 1936, from which the following data are taken.

I.Q. DISTRIBUTION OF STUTTERERS

I.Q.	Travis data	West data
Above 120	9.6	7.2
110-119	16.4	13.1
100-109	37.	20.7
90-99	19.	25.7
80-89	12	19.9
70-79	2.7	10.3
60-69	1.4	2.5
Below 60		.77

SCHOOL RETARDATION OF STUTTERERS (Wallin data)

Years retarded	Number	Per cent
0	90	17.7
$\frac{1}{2}$	5	1
1	185	36.4
2	134	27.5
3	55	10.8
4	24	4.7
5	6	1.2
6	2	.4
7	1	.2

¹ Murray, E., Disintegration of Breathing and Eye Movements in Stutterers during Silent Reading and Reasoning, *Psychol. Monogr.* 1932, **43**, 218-275; Hendrikson, E. H., Simultaneously Recorded Breathing and Vocal Disturbances of Stutterers, *Arch. Speech*, 1938, **9**, 79-96; and Travis, V., A Study of Horizontal Disintegration in Breathing during Stuttering, *Arch. Speech*, 1936, **1**, 157-169.

association with a stuttering parent, is not so clear. Nelson¹ studied the incidence of stuttering among 6,600 ancestors of 204 stutterers and compared the results with those of a similar study of 6,266 ancestors of 204 control nonstuttering subjects. She found 210 stutterers (143 males, 67 females) in the ancestry of the stutterers, but only 37 stutterers in the ancestry of the controls. There were 56 cases among the ancestry of the stutterers where the father, son, and grandson all stuttered. In the ancestry of the controls, there were but 4 such cases. 75 of the stutterers (37 per cent) had associated with stutterers; but 60 (29 per cent) of the controls had also associated with stutterers. In reporting this study, West concludes that a very large percentage of stuttering is due to heredity alone.

Wepman² made a similar comparative study of 250 stutterers and 250 nonstuttering control subjects, matched as to age, sex, and social environment. He checked the frequency of stutterers (other than the subject) in the families of both stutterers and nonstutterers. He found that 68.8 per cent of the families of stutterers contained other stutterers whereas only 15.6 per cent of the families of the control nonstutterers contained other stutterers. These results are shown in Table 104.

TABLE 104.—THE INCIDENCE OF STUTTERING IN THE FAMILIES OF STUTTERERS AS COMPARED WITH THE FAMILIES OF CONTROL NONSTUTTERERS

Subjects	Number of families studied	Families with no stutterers	Number of stutterers in subjects' families		
			Male	Female	Total
Male stutterers.....	180	46	202	51	253
Male nonstutterers.....	180	154	32	6	38
Female stutterers.....	70	32	45	12	57
Female nonstutterers.	70	57	15	4	19
Total, stutterers.....	250	78	247	63	310
Total, nonstutterers	250	211	47	10	57

Some evidence has been found that stuttering and twinning are inherited together. At any rate, they are both found in the same families more often than chance would account for. Berry³ found in

¹ West, R., Nelson, S., and Berry, M. F., *The Heredity of Stuttering*, *Quart. J. Speech*, 1939, 25, 23-30.

² Wepman, J. M., *Familial Incidence of Stammering*, *J. Hered.*, 1939, 30, 207-210.

³ Berry, M. F., *A Common Denominator in Twinning and Stuttering*, *J. Speech Disorders*, 1938, 3, 51-57.

a study of 250 families containing twins that there is one stutterer for each 18 children. (In unselected samples, there is one stutterer for each 100 children.) Considering just twins alone, she found the ratio of stutterers to nonstutterers to be 1 to 11.

CEREBRAL DOMINANCE

A right-eyed, right-handed, and right-footed person is said to be bilaterally right-sided. This means that he has left cerebral-hemisphere dominance, since the nerves cross over and one side of the brain controls the opposite side of the body. The bilaterally left-sided person has right cerebral dominance. However, some people are right-eyed, left-handed, and right-footed. This means that they have no cerebral dominance. In such cases, the sides of the brain are equipotential. After a study of cerebral lesions in 92 patients, Weisenberg¹ concludes that handedness is a criterion of the dominant brain hemisphere in at least 95 per cent of the cases. The dominant side of the brain also controls speech. Evidence for this fact is given by Chesher² who found in a study of 157 patients that brain lesions on the side opposite that of the preferred hand interfere with speech; while lesions on the same side as the preferred hand do not affect speech, except with those people who have no brain dominance. In such cases, lesions on either side affect speech.

There is some evidence that stuttering is more frequent among people who do not have cerebral dominance than among those who do. In 1912 Ballard³ observed in a study of 11,939 school children that stuttering occurred with greater frequency (25.8 per cent) among those who had been changed from left- to right-handedness. (It is now known that left-handed people are less bilaterally sided, *i.e.*, do not have cerebral dominance, than right-handed people. A change in handedness may not change brain dominance but may merely equalize it.) Oates⁴ found that 2.01 per cent of 4,176 school boys who had clear cerebral dominance also had speech defects, whereas 11.8 per cent of those who did not have cerebral dominance had speech defects. After a study of 600 cases, Quinan⁵ estimates that stuttering occurs in left-

¹ Weisenberg, T. H., A Study of Aphasia, *Arch. Neurol. Psychiat.*, 1934, **31**, 1-33.

² Chesher, E. C., Some Observations Concerning the Relation of Handedness to the Language Mechanism, *Bull. Neurol. Inst. N.Y.*, 1936, **4**, 556-562.

³ Ballard, P. B., Sinistrality and Speech, *J. Exp. Pedagogy*, 1912, **1**, 298-310.

⁴ Oates, D. W., Left Handedness in Relation to Speech Defects, Intelligence and Achievement, *Forum Educ.*, 1929, **7**, 91-105.

⁵ Quinan, C., Sinistrality in Relation to High Blood Pressure and Defects of Speech, *Arch. Intern. Med.*, 1921, **27**, 257-261.

handed men from three to seven times as frequently as in right-handed men.

Bryngelson¹ compared a group of 78 stutterers with a group of 78 control subjects, matched for sex, age, mental ability, and social status. He found that 58 per cent of the stutterers had had shifts in handedness and perhaps lacked definite brain dominance. His results are shown in Table 105.

TABLE 105.—COMPARISON OF STUTTERERS WITH CONTROL SUBJECTS IN HANDEDNESS

	Stutterers, Per cent	Normals, Per cent
Now right-handed.....	69	94
Now left-handed	6	6
Now ambidextrous	29	0
Handedness was shifted.	58	1
Left-handedness in family.....	49	42
Stuttering in family.....	54	6

Bryngelson claims that he has been unusually successful in correcting stuttering by "building up a dominant gradient in one cerebral hemisphere."² He says that "the success of the dominance technique is so marked that we have come to feel that a differential diagnosis, which usually considers other causal factors in treatment, though valuable is not absolutely essential." In building up cerebral dominance, he believes that sometimes it is necessary to shift handedness from right to left, where it was originally and should have remained, and sometimes it is merely necessary to make a right-, or left-, handed child more definitely right-, or left-, handed. The bilateral dominance may not be great enough and needs development. In 127 cases treated "with the cerebral dominance therapy," 42.5 per cent of them were cured and 47.5 per cent were "markedly improved." Only 13 of the 127 showed no improvement. Of these, seven should have been changed in handedness but because of parental objection the attempt was made to establish left brain dominance. During the summer, four of the cured cases went back to right-handedness and again began to stutter. In September they were shifted back again and by December were cured.

¹ Bryngelson, B., A Study of Laterality of Stutterers and Normal Speakers, *J. Soc. Psychol.*, 1940, 11, 151-155.

² Bryngelson, B., Treatment of Stuttering, *Symposium on Stuttering*, Madison, Wis., 1931.

Stutterers show other indications of the lack of cerebral dominance. Travis¹ found that there is a definite lack of coordination and synchronization between the two sides of the body in the breathing of stutterers. She estimates that at least 90 per cent of stutterers do not have bilateral synergy in breathing. Sometimes there is a complete lack of breathing movement on one side of the body, and sometimes an inspiration will be interrupted for an expiration. There is poor rhythm. Cross² compared a group of 42 stutterers (31 right-handed, 11 left-handed) with an equated group of nonstutterers and found that the stutterers were decidedly inferior to the controls in bimanual activity. Right-handed controls were superior to stutterers in the rate of movement of the right hand, the left hand, lips, jaw, tongue, and diaphragm. Left-handed controls were superior only on left-hand movements.

TABLE 106.—COMPARISON OF 70 STUTTERERS WITH 70 CONTROLS ON VARIOUS PHASES OF BILATERAL DOMINANCE

	Stutterers		Nonstutterers		Critical ratio of difference
	Number	Per cent	Number	Per cent	
Handedness:					
Right.	59	84	62	89	.86
Ambidex	0	0	1	1	.83
Left	11	16	7	10	1.05
Eyedness:					
Right.	39	56	45	64	.96
Ambidex	5	7	3	4	.77
Left	26	37	22	32	.38
Footedness:					
Right.	53	76	56	80	.57
Ambidex.	7	10	7	10	.00
Left.	10	14	7	10	.73
Laterality:					
Right.	56	80	58	83	.45
Ambidex	5	7	5	7	.00
Left	9	13	7	10	.56

However, all studies do not substantiate the data given above. In fact, some evidence indicates that there is no relation between cerebral

¹ Travis, V., A Study of Horizontal Disintegration in Breathing during Stuttering, *Arch. Speech*, 1936, 1, 157-169.

² Cross, H. M., The Motor Capacities of Stutterers, *Arch. Speech*, 1936, 1, 112-132.

dominance and stuttering. Daniels¹ gave handedness tests to 1,548 college students and found data that "lend little or no support to many relationships commonly reported as existing between handedness and stuttering." There were 138 ambidextrous students, four of whom stuttered. The rest (1,376) were right-handed and 15 stuttered.

Spadino² studied a group of 70 stutterers in comparison with a control group of 70 nonstutterers, matched as to age, race or language of parents, and mental ability. He found no significances between the two groups in any phase of cerebral dominance. His results are shown in Table 106. The author concludes, "This study has found little evidence to corroborate the theory that stuttering is often associated with lack of unilaterality."

In face of this conflicting evidence regarding the relation of cerebral dominance to stuttering, any conclusion must be postponed until further research clears up the matter. Why different studies using essentially the same methods of investigation should find opposing results is not now understood. However, it has happened before in science and will happen again. There are many problems in all fields of science about which there is conflicting evidence.

MENTAL ADJUSTMENT

Fletcher³ argues that, because the stutterer can speak perfectly on certain occasions but stutters on others, his real difficulty must lie in his relationship to those stuttering occasions. "All communication demands a social adjustment, either intellectual or emotional, or else both at once. . . . Stuttering represents a morbidity of these adjustment processes, . . . a pathological social response." In other words, stuttering is merely a symptom of a social maladjustment, or a psychoneurosis. It is not a speech problem per se at all. When the mental adjustment problem is taken care of, the stuttering symptom disappears. "We are forced to conclude that the speech instrument of the stutterer is normal, and that its malfunction is due to a state of mind which appears to be subject to some degree of control."

From this point of view, the treatment of stuttering becomes psychological. If the individual learns to become adjusted to his social environment, his speech problem is taken care of. The real

¹ Daniels, E. M., *An Analysis of the Relation between Handedness and Stuttering with Special Reference to the Orton-Travis Theory of Cerebral Dominance*, *J. Speech Disorders*, 1940, 5, 309-326.

² Spadino, E. J., *Writing and Laterality Characteristics of Stuttering Children*, *Teach. Coll. Contr. Educ.*, 1941, No. 837.

³ Fletcher, J. M., *The Problem of Stuttering*, Longmans, Green and Company, New York, 1928.

treatment, then, is mental hygiene. Fletcher warns that this must be done by "providing an environmental situation in which he can function normally until his speech processes have become properly fixed and his emotional attitude reconditioned." The environment must be molded to fit the stutterer instead of trying to mold him to fit an environment that has already caused him to develop a psycho-neurosis. Then, as he becomes more successful and confident in his adjustments, he will become more proficient in speech.

Most of the medical authorities on stuttering agree with Fletcher. They believe that stuttering is a mental problem and must be treated accordingly. Dr. Smiley Blanton believes that "the fault is not with the organs used in speech but with the emotional difficulty in the unconscious. . . . Psychoanalysis is the preferred method for assisting in readjustment, for discovering the difficulty." However, since this is "open only to a limited number because of the time and expense involved," Blanton approves of "a practical application of good mental hygiene." He believes that "when the emotional reeducation is accomplished the speech difficulty will take care of itself."¹

Dr. Coriat believes that "stammering is a psycho-neurosis caused by persistence into later life of early pregenital oral nursing, oral sadistic, and anal sadistic components. . . . Because stammering is a neurosis, psychoanalysis is the therapy of choice."²

There is some test evidence to justify the view that stutterers are maladjusted personalities. Bender³ compared a group of 249 male stutterers with a control group of 303 male nonstutterers on the Bernreuter Personality Inventory. He found that "the stuttering group was significantly higher neurotically, more introverted, less dominant, less self-confident, and less sociable" than the control group.

Stinchfield⁴ administered the Thurstone Personality Schedule to 46 girls in the speech correction classes at Mount Holyoke College. (They were not all stutterers.) She found that 60 per cent of the items listed by Thurstone as indicating psychoneurotic tendencies were in her list of high frequency items. She believes that "this in itself is a strong argument for the need of mental hygiene as well as corrective speech work with these students."

¹ These quotations are from Blanton's statement of his own theory of stuttering as found in Hahn, E. F., *Stuttering—Significant Theories and Therapies*, Stanford University Press, Stanford University, California, 1943.

² From Hahn. *Ibid.*

³ Bender, J. F., *The Personality Structure of Stuttering*, Pitman Publishing Corporation, New York, 1939.

⁴ Stinchfield, S. M., *Speech Disorders*, Harcourt, Brace and Company, New York, 1933.

Schroeder and Ackerson¹ studied the relation of stuttering to a large number of behavior factors. They found low but positive correlations between stuttering and psychoneuroticism, mental conflict, lack of initiative, inefficiency in study, inferiority complex, unpopularity, nervousness, and being teased by other children. They found negative correlations between stuttering and bad companions, running with a gang, heterosexuality, truancy, contrariness, stealing, and destructiveness. The authors suggest that, while stuttering is associated with psychoneurotic unaggressive behavior, there is a question as to which is cause and which is effect, or perhaps both are "symptoms of some deeper lying causal complex."

BIOCHEMICAL FACTORS

Starr² found that stutterers are "overloaded with carbon dioxide far in excess of normal speakers." He believed that breathing exercises and a decrease of carbohydrates in the diet would improve the stutterer's condition. Travis³ admits that stutterers have an excess of carbon dioxide in the blood stream, but he believes it to be "a result of the faulty breathing of the stutterer in his attempts at speech."

TABLE 107.—COMPARISON OF THE BLOOD SERUM RATIOS OF STUTTERERS AND NORMALS

Blood serums	Normals	Stutterers
Calcium and inorganic phosphate	Negatively correlated	Positively correlated
Calcium and protein. . . .	Positively correlated	Negatively correlated
Potassium and inorganic phosphate	Positively correlated	Negatively correlated
Potassium and protein. . . .	Negatively correlated	Positively correlated

Kopp⁴ has found a series of abnormal serological ratios in the blood stream of stutterers. Inorganic phosphate and sugar are excessive in quantity, while protein and calcium are below normal. More serious than the abnormal amount of these chemicals, however,

¹ Schroeder, P. L., and Ackerson, L., Relationship of Personality and Behavior Difficulties to Disorders of Speech, in a *Symposium on Stuttering*, Madison, Wis., 1931.

² Starr, H. B., The Hydrogen Ion Concentration of the Mixed Saliva, *Amer. J. Psychol.*, 1922, **33**, 394-418.

³ Travis, R. C., *op. cit.*

⁴ Kopp, G. A., Metabolic Studies of Stutterers, *Speech Monogr.*, 1934, Vol. 1, No. 1.

is the abnormal ratio they hold to each other in the blood of stutterers. This is summarized in Table 107.

West¹ believes that while these chemical differences are unimportant in ordinary living processes, they may "affect speech disastrously." Some people are of the "normal biochemical type and never stutter." Others have a blood chemical unbalance "so marked that they stutter even when reading or speaking to themselves in complete privacy." Then, there are borderline people whose blood chemical balance depends on "changes in their social medium." When these unfortunate conditions of poor social adjustment occur, they cause a temporary blood chemical unbalance that produces the stuttering syndrome—bilateral incoordination, constriction of peripheral blood vessels, irregular breathing, etc.

Berry and Eisonson² suggest that there may be some connection between basal-metabolism rate and stuttering. They have observed in a few cases that a high basal-metabolism rate is accompanied by stuttering. "Two months after W.B.'s operation for exophthalmic goiter (BMR, plus 35), his wife reports that the stuttering which appeared with the illness was no longer noticeable." Obviously, there is need for more data.

HABIT

Some authorities (Dunlap and McDowell) believe that stuttering is merely "a habit which can be broken." Children who stutter do so because of associating with others in the home who stutter or because they have never formed that rhythmic flow of speech characteristic of the normal person. The remedy is merely a process of breaking an undesirable habit and forming a desirable one in its stead. Dunlap suggests his "beta hypothesis" as the best means for this procedure.³

It is undeniable that children who stutter have a habit of doing so. The cause may be heredity, or the lack of cerebral dominance, or poor mental adjustment, or something else, but the result is a stuttering habit. However, to say that all stuttering is merely a bad habit without any underlying cause is to ignore the research in stuttering, which now indicates that there are various causes. The correction of stuttering is more than a process of breaking one habit and forming another. The first step is to remove the cause.

¹ West, R., Kennedy, L., and Carr, A., *The Rehabilitation of Speech*, Harper & Brothers, New York, 1937.

² Berry, M. F., and Eisonson, J., *The Defective in Speech*, F. S. Crofts & Co., New York, 1942.

³ Dunlap, K., *Habits, Their Making and Unmaking*, Liveright Publishing Corporation, New York, 1932.

It is true that after the cause of stuttering has been removed, there often remains a residual stuttering habit. Perhaps this can best be broken by negative practice, or some other simple procedure. Dunlap advises that the stutterer study "his specific type of involuntary spasm, copy this as nearly as possible, and then stutter voluntarily." At any rate, it is now a speech problem per se and can be taken care of by speech drills.

McDowell¹ advises that the first step in correcting the speech of stutterers is the "recognition of the habit to be acquired by the person who must acquire it," then to "apply many exercises and activities for setting up connections." Unfortunately, this advice is worthless if the original cause of stuttering has not been taken care of. The stutterer's difficulty is, not that he lacks good speech habits, but that he cannot use them at critical times. When he talks to himself or to his dog, or when he whispers, his speech is perfect. He does not need new speech habits; he merely needs to be able to use his habits without being blocked by neuromuscular spasms.

It is obvious that modern research has not yet solved the problem of why children stutter or of how to cure them of it. But it has indicated rather definitely that they stutter for various reasons and can be improved by various procedures. Also, it has revealed enough of the causes and conditions of stuttering to cast doubt on the claims of the "specialist" who has developed a "revolutionary" technique for curing all stuttering (provided the patient pays a liberal fee).

SPEECH DISORDERS DUE TO DEFECTIVE HEARING

Hearing is just as necessary in learning to speak as seeing is in learning to write. In general, those who cannot hear cannot speak. There is nothing wrong with their speech mechanism. They are mute, or dumb, because they are deaf. It was believed, until in comparatively recent years, that people who are completely deaf cannot learn to talk at all. Then, it was discovered that by using the phonetic method deaf people can be taught to talk; and by lip reading they can learn to understand what is being said to them. Now, the most up-to-date institutions for the deaf teach phonetic speaking and lip reading, instead of the ancient sign language.

There are degrees of hearing loss, from normal hearing to complete deafness. Those who can hear well enough to learn vocal speech in the ordinary course of events and yet have a hearing handicap are classed as *hard-of-hearing*. Those who do not hear well enough to develop

¹ McDowell, E. D., Some Interpretations of Recent Researches in the Correction of Stuttering, in *A Symposium on Stuttering*, Madison, Wis., 1931.

vocal speech, unless they are given special phonetic training, are classed as *deaf*. The normal person hears frequencies (pitch) between 20 and 20,000 and intensities from the hearing threshold up to the feeling threshold, *i.e.*, when the sound is so loud that it is felt by other body tissues. (Of course, when sound becomes so loud that it can be felt, the deaf person is at no disadvantage.) However, speech usually occurs within a much narrower range of frequencies (100 to 8,000). Tests to determine the percentage of hearing loss generally include the range from 64 to 8,192 vibrations. As they are generally used in speech, phonetic sounds vary in pitch from those of low frequencies (such as b, d, m, n, ng, j) to those of the highest frequencies (such as th, s, z, f, ch).

THE HARD-OF-HEARING

It is estimated by Phillips and Rowell¹ that there are 3 million school children in the United States who have a hearing loss great enough to handicap them in schoolwork, but not great enough to prevent them from learning vocal speech. After a survey of the New York City schools, Caplin² estimates that at least 4.5 per cent of the school children in that city need otological diagnosis and 3.5 per cent need special instruction in lip reading. (He found that training in lip reading reduced the percentage of school retardation of a group of 4,566 hard-of-hearing children from 41.9 before lip reading to 5.6 after lip reading.)

The hard-of-hearing child misses many things in schoolwork because of his handicap. Sometimes this makes him appear mentally dull. However, studies show that, excluding the effects of his sensory handicap, the hard-of-hearing child is normal in intelligence. Pintner and Lev³ compared a group of normal children with a group of hard-of-hearing children and another group of extremely hard-of-hearing children on a verbal intelligence test. As was to be expected, the hard-of-hearing groups showed the effects of their handicap. Then, they compared normals with hard-of-hearing and extremely hard-of-hearing children on a nonlanguage intelligence test. Here the handicapped children showed no significant inferiority. These results are shown in Table 108. Some hard-of-hearing children were tested on both the language and the nonlanguage tests. They showed a higher I.Q. on the latter test than on the former.

¹ Phillips, W. C., and Rowell, H. G., *Your Hearing, How to Preserve and Aid It*, D. Appleton-Century Company, Inc., New York, 1932.

² Caplin, D., A Special Report of Retardation of Children with Impaired Hearing in the New York City Schools, *Amer. Ann. Deaf*, 1937, **82**, 234-243.

³ Pintner, R., and Lev, J., The Intelligence of the Hard of Hearing School Child, *J. Genet. Psychol.*, 1939, **55**, 31-48.

The effect of hearing loss is especially obvious when the educational achievement of hard-of-hearing children is studied. Pintner¹ and others have studied the effects of hearing loss on personality. In

TABLE 108.—COMPARISON OF NORMAL WITH HARD-OF-HEARING CHILDREN ON MENTAL ABILITY TESTS

Group	N	Mean I.Q.	Sigma	Mean diff.	Sigma diff.	Mean diff. Sigma diff.
Verbal test:						
Normals	1,286	99 75	24.55			
Hard-of-hearing	1,186	94 67	24.12	5.08	.98	5.2
Extremely hard-of-hearing	462	92.47	24.57	7.88	1.33	5.5
Nonverbal test:						
Normals	372	102 16	21.5			
Hard-of-hearing	315	99 29	20.5	2.86	1.6	1.8
Extremely hard-of-hearing	140	99.26	21	2.80	2.09	1.4

TABLE 109.—MEAN SCORES ON PERSONALITY TESTS FOR GROUPS OF VARIOUS DEGREES OF HEARING

Personality test	Normal hearing	Hard of hearing	Extremely hard of hearing	Correlation of hearing-loss and trait
General adjustment:				
Boys	79 5	77 4	75.4	
Girls	84	84 6	81.9	
Ascendance-submission:				
Boys	18 31	18.64	18.71	.05
Girls	16 37	16 65	17.45	.08
Introversion-extroversion.				
Boys	21 79	21 13	21 71	.004
Girls	20 82	20 54	19 36	-.08
Emotional stability:				
Boys	25 34	23 87	22 24	-.07
Girls	26 35	25 37	21 03	-.14

general, the effects are slight but obvious. The hard-of-hearing groups (those with 15 decibels loss and those with 30 decibels loss) are not quite so well adjusted as the normals, and the differences are statistically significant. This is likewise true of emotional stability.

¹ Pintner, R., An Adjustment Test with Normal and Hard of Hearing Children, *J. Genet. Psychol.*, 1940, **56**, 367-381; Some Personality Traits of Hard of Hearing Children, *J. Genet. Psychol.*, 1942, **58**, 143-151.

The greater the hearing loss, the less the degree of emotional stability. However, as indicated by the low correlations in Table 109, this negative relationship is not great. The traits of ascendance-submission and introversion-extroversion show no significant relation to hearing loss.

The handicap from partial loss of hearing can be largely overcome by two procedures—hearing aids and lip reading. Hearing aids are portable and can be worn inconspicuously. The type of device most appropriate depends on the nature of the hearing loss, *i.e.*, the part of the auditory anatomy that is deficient. Stationary hearing aids are sometimes furnished by the school. Of course, the function of all hearing aids is to amplify sound so that it can be heard. Lip reading is especially valuable as a supplement to impaired hearing. What the ears do not hear, the eyes can often see. When a sound is not quite audible, the slight additional cue of seeing it being articulated is all that is necessary for its perception. Lip reading is often limited by the fact that some sounds are made by the same action of the articulating organs as some other sounds. For example, the sounds *b* and *p*, *d* and *t*, *l* and *n*, and *g* and *k* look alike to the lip reader. However, training develops unusual skill in perceiving speech just from watching its production.

THE DEAF

Because deaf children are unable to learn vocal speech, they get but little value out of attending the public schools. Consequently, the state provides institutions for the education of deaf children. Except for the accumulating effects of being unable to hear, deaf children are no different from other children. They are mute, not because there is anything wrong with their speech mechanism, but because they are deaf and cannot imitate the sounds of other people. Their intelligence is no higher and no lower than the average, although they are handicapped on verbal tests. They are retarded educationally, as would be expected.

Two things about the training of deaf children in modern institutions for this purpose seem almost miraculous—they are taught to speak, and they are taught to understand the speech of others. Deaf children can be taught to speak by the phonetic method. This consists of patiently learning to make each elementary sound separately and then in word combinations. Both sight and feeling are used to enable the children to learn the slight differences between some of the sounds. They watch the teacher to see how to place the articulating organs, and then they feel her throat with their fingers to get

the feel of the proper vocal action. It is a slow tedious process that requires endless patience.

To learn how to understand the speech of others, deaf children are taught lip reading. This does not mean, however, that they observe only the lips. The rest of the face and the hands indicate the emotional content of speech. The articulating organs indicate only the ideational content of speech. The greatest difficulty of lip reading is to distinguish between those words that *look* alike, such as, nine and dine, new and dew, labor and neighbor, etc. Another difficulty in lip reading is the great differences between people in articulating speech. Some speak with a masklike facial expression and a minimum of lip and jaw movement. Even hearing people cannot understand them easily. But with proper training, the deaf person can learn to understand speech with amazing accuracy.

SUMMARY

One of the most neglected fields of human affliction is that of speech disorders. Charlatans flourish as in no other field. Well-trained speech correctionists are too few to take care of the needs of but a small fraction of those who need help. Even the public schools all but ignore this major human handicap.

Fortunately research is beginning to accumulate, and scientific diagnosis and therapy are now possible. A sampling of such research was reviewed in this chapter to indicate that many data already exist. Except for the disorders of speech rhythm, almost every kind of speech defect can now be properly diagnosed and improved by treatment. Even stuttering is well enough understood to be diagnosed with a degree of accuracy and treated with some success.

However, speech correction is a field where specialization and scientific training are essential. Not only must the correctionist understand speech but he must be a psychologist as well. Courses in public speaking and voice improvement are of but little value in the scientific treatment of speech disorders. Speech correction is a field of applied psychology and has but little in common with the descendants of elocution.

RECOMMENDED SUPPLEMENTARY READING

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CHAPTER X

PSYCHOLOGY IN PUBLIC OPINION AND PROPAGANDA¹

Public Opinion

Stratified Sampling

How Should Questions Be Phrased?

Do Interviewers Bias Poll Results?

Who Selects the Questions to Be Asked?

Some Special Techniques

Follow-up Questions

Open-end Interviews

Panel Studies

Intensive Spot Surveys

Mass-Observation

Validity

Determinants of Opinion

Education

Economic Status

Education versus Economics

Cultural Area

Emotion

Propaganda

Propaganda and Thinking

Realistic Thinking

Animistic Thinking

Other Psychological Mechanisms

Effectiveness of Propaganda

Propaganda and the Learning Process

Propaganda Devices

Name Calling

Transfer

Glittering Generalities

Testimonial

Plain Folk

Card Stacking

Bandwagon

Measuring the Propaganda Environment

Exposure Frequency

Public Opinion in a Democracy

PUBLIC OPINION

It is today clear that domestic and foreign affairs, whether conducted by business or by government, are influenced to a significant

¹ This chapter was written by Dr. Ross Stagner, Professor of Psychology at Dartmouth College.

extent by public opinion. Sociologists pointed out long ago that law enforcement is all but impossible, in the face of adverse public opinion, and difficult without a general belief in the justice of the law. Nowadays economists, historians, and political scientists are finding the "climate of opinion" an important factor in their respective fields.

It is easy to document this statement with a brief reference to the fate of the prohibition amendment and with a mention of the tide of nationalistic feeling that swept the Allied Nations generally after the First World War, to the fatal exclusion of efforts at international organization. If, however, we turn from these concrete cases to a general definition of the concept, "public opinion," we encounter more difficulty than might be expected. The term *opinion*, first of all, refers to a mental state of readiness to *approve* or *disapprove* of a given psychological object.¹ One is likely to have an opinion about labor unions, about socialism, about Adolf Hitler, etc. These are predominantly emotional reactions of approval or disapproval. However, opinions also may be qualitative; *e.g.*, one may believe that Germans are inherently aggressive, Russians cruel, and Britons phlegmatic. At any rate, every opinion takes the form of a judgment about some object of thought.

Opinions must be further classified as public or personal. The difference in this case develops from the number of persons who are aware of the object of opinion. Among Americans, opinion about the late President Roosevelt is public, whereas the opinion of a grocery clerk about his boss is personal. At the most, it is of interest to a limited circle of individuals. There is a fairly well-defined public opinion about the British Labor Party but not about the Egyptian Wafdist Party. In other words, public opinion must arbitrarily be limited to such psychological objects that have some reality for a significant proportion of the population.²

Opinions may be openly expressed or they may be concealed. Social pressures may prevent unconventional opinions from being revealed. Church members often officially condemn what they privately practice. Many Americans who in 1935 connived with the Nazis to rearm Germany have since been most vociferous in denouncing German rearmament.

To the extent that we are concerned with practical problems in

¹ The term "psychological object" covers anything that may be an object of thought: a nation, a policy, an individual, or a logical proposition.

² The exact percentage that would be significant would, of course, be a matter of personal judgment and to some extent would vary with the issue under consideration.

business, government, race relations, and the like, we shall want most to know what public opinion means as a clue to action. Thus it may be important to go behind expressed opinions to get at private beliefs not openly avowed. On the other hand, it is not legitimate to discard all opinion surveys merely because people's actions do not invariably harmonize with their verbal expressions.

The study of public opinion can have considerable value in connection with major social problems of our time. It is, for example, at the core of such a question as the extent to which the German people are responsible for the acts of their Nazi government. It may be well argued that the Nazis could not have carried out their aggressive policies without considerable support. On the other hand, the Nazis never got more than 39% of the votes in a free election. This suggests that, while there were substantial elements of the population that were pro-Nazi, the mighty propaganda machine of Dr. Goebbels was needed to maintain an appearance of a public opinion united behind Der Fuehrer.

Public opinion on domestic and foreign policies has a profound bearing on the future welfare of the American people. The approval given to high tariffs and economic nationalism will significantly affect the prospects for enduring peace. On such issues as publicly owned enterprise, social security, and other economic policies, public opinion may well decide for or against dependable prosperity. Even if a majority, by inaction, allows a minority effectively to control national affairs, the majority is to some extent responsible for the failure to take a decisive stand.

In a democracy, this role of public opinion has long been recognized. Even George Washington bowed to, or tried to modify, the opinions of his citizens. George Fort Milton has recently called attention to the great powers of the President as "Chief of Public Opinion." And it is true that a vigorous President can play an important role in leading the people. On the other hand, many of our chief executives have accepted policies personally distasteful to them because convinced of the public demand for such acts.

This serves to emphasize a key point in this chapter: *viz.*, that it is vital to obtain measurements of public opinion by the best scientific methods. Traditionally, Congressmen have talked with their constituents; diplomats have sounded out opinion abroad; straw votes have been cast. But these methods far too often have led to hopelessly inaccurate data. Congressmen usually talk to friends; diplomats move only in upper-class circles; straw votes are subject to a variety of errors.

In the last two decades, the basic techniques have been worked out for obtaining a reliable index of the opinion trends in the entire population, based upon interviews with a relatively small sample. While these procedures are still subject to refinement in detail, it is unlikely that they will be modified in any important respect. An understanding of these principles is essential to further study of the science of public opinion.

STRATIFIED SAMPLING

To get a perfect picture of opinion on any issue, it is theoretically necessary to interview every person affected by it. This is clearly impossible on topics affecting thousands and millions of individuals. We then turn to the task of obtaining a truly *representative sample* that will give us the trend for the entire population within a specified margin of error. This is the same problem that faces a democratic society; our representative system of government is based upon geographic sampling. Each senator or congressman represents all the citizens of a given area.

Now opinions do differ geographically. Southerners disagree with Northerners, and the Middle West with New England. But differences within regions are greater. Workers and employers, for example, usually have sharper disagreements than characterize regional differences. Persons of little education see public affairs in a manner quite at variance with that of the college graduate.

The science of sampling develops from simple facts such as these. If men and women are found to disagree on many topics, then future polls must equalize the sexes to get a balanced result. If the wealthy, middle-class and poor people have divergent views, each stratum must be represented in numbers proportional to the number in the whole population. Thus, the well-to-do must be a minority of the group polled rather than a majority, as in the ill-fated Literary Digest poll of 1936. Racial groups must be allowed a voice proportional to their total size, and so on.¹

There are four major agencies making opinion surveys in the United States today on the basis outlined, known as *stratified random sampling*. They are the American Institute of Public Opinion, headed by Dr. George Gallup, whose books² give a clear, popular account of how the

¹ If a primary aim of the poll is to predict the outcome of an election, then groups must be balanced on the basis of probable voting. Thus, Southern Negroes rarely are permitted to vote and must be excluded in surveys of this type.

² Gallup, G., *Guide to Public Opinion Polls*, Princeton University Press, Princeton, New Jersey, 1944. Also (with S. F. Rae) *The Pulse of Democracy*, Simon & Schuster, Inc., New York, New York, 1940.

polls work; Fortune Survey, conducted by Elmo Roper; Office of Public Opinion Research, headed by Dr. Hadley Cantril, author of some technical contributions¹ on the science of polling; and the National Opinion Research Center, headed by Dr. H. H. Field. AIPO² is financed by the sale of columns to newspapers, and Fortune Survey is handled by *Fortune Magazine*. So far no evidence has appeared to indicate any biasing of either survey by financial domination. OPOR is loosely affiliated with AIPO and also with Princeton University, and NORC is associated with the University of Denver. Both these last two organizations are privately financed and professionally staffed.

The exact layout of the scientific cross-section of the American population, used as a basis for national poll results, differs in detail but not in principle for each of the four agencies. As a type we cite the standard NORC sample, which, based on 2,500 people, can identify American opinion trends with a probability of 997 in 1,000 that the margin of error will be less than 3 per cent. Of these 2,500 people, 46 per cent will be male, 54 per cent female; 91 per cent White, 9 per cent Negro; 15 per cent upper economic level, 53 per cent middle, 32 per cent lower; 18 per cent college, 39 per cent high school, 43 per cent grade-school trained; 27 per cent will live in New England, 32 per cent in the Midwest, 29 per cent in the South, and 12 per cent Far West. They will also be properly distributed as to size of city, type of occupation, etc. (These figures are periodically corrected to allow for population changes, e.g., reduction in percentage of men during the war.) Very precise instructions to interviewers result in meeting these proportions with very few errors.

For such simple problems as the forecasting of a presidential election, the stratified sampling technique is virtually the only new development necessary to ensure dependable results. Public opinion, however, is of great importance on a variety of issues other than the actual choice of candidates. In connection with more complex issues, the polling agencies have grappled with, and are beginning to solve, such questions as the following:

How Should Questions Be Phrased?—One of the trickier aspects of opinion surveys has been that of phrasing the item so that it does not predetermine the results. In the early days, opinion polls were often deliberately slanted by loading the question. An advertising man in a

¹ See, e.g., Cantril, H., *Gauging Public Opinion*, Princeton University Press, Princeton, New Jersey, 1944.

² For convenience the polls of the various agencies will hereafter be identified by initials: AIPO is American Institute of Public Opinion; OPOR, the Office of Public Opinion Research; and NORC, the National Opinion Research Center.

frank moment once referred to them as fishing expeditions: "We knew what we wanted and went after it with a poll."

Today the elimination of bias due to faulty question construction seems in the main successful. Double-barreled items are rarely seen nowadays; prestige-bearing terms are mostly weeded out; and unusual words are either eliminated or carefully defined.

A fundamental procedure of all agencies now is to pretest their questions on small groups to see if the meaning is clear. The results of such tests are sometimes startling. Even simple words may carry different meanings for different interviewees. Consider the following OPOR question: "After the war is over, do you think people will have to work harder, about the same, or not so hard as before?" This item looks clear and impartial, yet there are three words that created confusion in the results. It was found that "people" meant "everybody in the United States" to 60 per cent of the persons questioned but meant limited groups to the rest; "harder" meant "longer hours" to 15 per cent, "more carefully and accurately" to 25 per cent, and "against stiffer competition" to 12 per cent. "Before" meant "pre-war times" to 50 per cent, "earlier in the war" to 37 per cent, and so on. Before a question is through its pretesting, an attempt is made to iron out all of these misunderstandings.

Another problem in phrasing questions arises in providing fair alternatives. Some questions are like, "Have you stopped beating your wife? Answer yes or no." It is not even possible in some cases to decide how many alternatives ought to be shown. NORC once asked the question, "Do you think we ought to start thinking now about the kind of peace we want after the war?" Eighty-one per cent answered in the affirmative. Later they used this form: "Which of these seems better to you: for us to win the war first and then think about the peace, or to start thinking now about the kind of peace we want after the war? In this case only 41 per cent endorsed the proposal to start thinking now, because the question implied that such thinking is in contradiction to vigorous effort on behalf of winning the war. Should this alternative be presented or ignored?

This question must also be considered in the light of the fact that a certain number of people manifest what might be called the "yes" tendency; *i.e.*, they tend to agree with whatever proposition is positively presented. Thus some individuals will express themselves as favoring both a high tariff and a low tariff; national isolation and collective security, etc., if these propositions are presented positively and not too close together. So the opinion poller usually tries to correct for this, by reversing his question with half the group or by requiring a choice between two alternative answers.

Early opinion surveys were often loaded with emotional terms and implied arguments. That such loading is highly effective can be demonstrated with the following three versions of the same idea, circulated as an experiment by Fortune Survey:

A	B	C
Do you think that the government should or should not forbid labor in defense industries the right to strike about working conditions?	Because every man is entitled to safe and healthy working conditions, labor (in defense industries) should be allowed to strike for them.	Because working conditions in this country are the best in the world, labor (in defense industries) should not be allowed to strike about them.

The percentage approving a ban on defense strikes was as follows: A, 59 per cent; B, 45 per cent; C, 74 per cent. Obviously, phrasing of items can seriously distort survey results. While the above were intentional and flagrant violations of good presentation, it is possible for an apparently impartial item to be subtly loaded and to give misleading results. Alleged facts about public opinion must never be accepted without a consideration of this possibility. Pressure organizations representing a small group of people are especially anxious to create the appearance of having a wide backing. Surveys not conducted by any of the four agencies mentioned above are thus open to suspicion, although they may be properly set up and handled in good faith.

Do Interviewers Bias Poll Results?—The mail ballot has been discarded from opinion-survey work because only the more educated segments of the population, or those with axes to grind, will answer. The use of personal interviews raises another question; does the interviewee tend to give the answers he thinks the interviewer wants or expects?

The facts to date indicate that different interviewers do get results that are biased in certain ways. Most important seems to be appearance and status of the interviewer. An extreme case is found in an NORC study of Southern Negro opinions, as reported respectively to Negro and White interviewers. It seems unquestionable here that

How do you think Negroes would be treated if the Japanese conquered the U.S.A.?	Negro interviewer	White interviewer
	Per cent	Per cent
Better.....	9	2
Same as now.....	32	20
Worse	25	45

the Negroes have given biased answers to the interviewer of the dominant race.

To some extent, interviewers bring back answers loaded in favor of their own views; thus, Republicans err by overestimating the vote for their party; interventionist interviewers found more people agreeing with them, while isolationist interviewers found a larger proportion of isolationists in the population, in the heated days of early 1941; and middle-class interviewers turn up more antilabor attitudes than do working-class interviewers.

The only controls devised so far on this point are, first, to train interviewers to conceal their own views;¹ and second, to use interviewers from varying social and economic groups so that any systematic errors will cancel each other in the final result.

In some experiments, the interviewer has been ruled out entirely by having the respondent mark a ballot, which is then folded by him and placed in a locked box. This secret voting method encounters difficulties in a population of limited literacy. It does, however, reveal some hidden attitudes that would be subject to social disapproval if expressed to the interviewer directly; *e.g.*, anti-British or anti-Jewish prejudices. The best future, none the less, seems to lie in better training of interviewers rather than in developing the secret-ballot technique.

Who Selects the Question to Be Asked?—If opinion polls are to fill their rightful place in a democratic society, they must cover all issues on which public opinion is divided. Yet those selecting poll issues may ignore problems on which they do not care to have light cast; or, more dangerous still, they may be forbidden to ask certain questions. To take some random examples, nobody has asked the people of India how they feel about the Congress-Moslem League controversy. The people of Poland may never get a chance to reveal whether they wanted the government-in-exile to return. Aside from the ban on polling soldiers, the American government has apparently been fairly careful to avoid arbitrary restrictions on the topics covered by polling agencies. This question of over-all control of the polls can be posed, but the answer goes beyond the limitations of this book.

SOME SPECIAL TECHNIQUES

The basic technique of current opinion study is the personal interviewing of single individuals, selected by chance but in accordance with

¹ In this connection see the standard instructions given all interviewers for NORC: Williams, D., *Basic Instructions for Interviewers*, *Publ. Opin. Quart.*, 1942, 6, 634-641.

fixed sampling rules, on specific questions with specified alternative answers. In recent years the limitations of this procedure have induced the development of a variety of special techniques, each of which is useful for certain purposes. Some of them will be sketched here very briefly.

Follow-up Questions.—A bare yes or no answer to a question of a general character may not be very revealing. Some pollsters prepare a battery of follow-up questions to clarify details. NORC conducted a survey on world organization, for example, in which those who wanted to see measures of this type taken for the maintenance of peace were asked to indicate what functions the world organization should have. It was then found that the average American would accept international government if it meant such sacrifices as continued rationing of food, paying more taxes, and keeping part of our army as a sort of international police force; but a majority opposed giving up our armed forces entirely, opposed giving up reparations, and opposed free trade with other countries in the organization. This gives a much clearer picture than the bare statement of approval of a union of nations.

Open-end Interviews.—For nation-wide sampling purposes, it is necessary that respondents be required to pick one of a fixed set of alternatives. If each person were allowed to answer freely, the tabulation of a national trend would be virtually impossible because of the shades of difference expressed by these varied responses.

There are, however, circumstances under which the free answer or open-end interview is desirable. One is the case in which a question is too complex for the preparation of a reasonable limited number of alternatives. Another arises when the presentation of answer choices might be expected to prejudice the result. A third is found in studies seeking to determine the causal background of opinion.

Open-end interviews must necessarily be conducted by skilled psychologists, as opposed to the average interviewer who is trained only in a specific method. The casual or apparently irrelevant remarks of the interviewee may have considerable meaning for the expert. Suppose, for example, that a man stated vehemently that he would vote for Willkie against Roosevelt, repeating the argument that Roosevelt was becoming a dictator. Then he went into a rambling description of his own father. A listener sensitive to emotional reactions could form a pretty accurate judgment on the spot as to the likelihood that the political reaction was merely a displacement of latent hostility toward the father.

This method has been used extensively in studies of nationalist

attitudes,¹ morale,² and other problems. It is often used at the beginning of a study, to clarify possibilities that may be put into the customary objective form; it is equally valuable as a follow-up to extensive interviewing with the usual technique, in that it gives an opportunity to check theories that may have developed during an investigation.

Panel Studies.—When Dr. Gallup reports that there has been an increase in support for a world organization, he means only that the current sample shows a higher proportion in favor than was found in an earlier interview. The second sample does not include any of the individuals interviewed on the first occasion. The policy of getting an entirely new group of each survey is a good one, because repeated questioning might introduce a vitiating factor into the situation.

It may, however, be desirable to find out how specific persons change from time to time. During a political campaign, for example, it would be interesting to know the effects of a big mass meeting, a radio speech by a presidential candidate, or exciting world events upon the momentary choices of the electorate. To gain such information psychologists have developed the panel technique. A panel is composed of a carefully selected sample, representative of the general population, each member of which is interviewed regularly.³

Intensive Spot Survey.—Instead of trying to get a fair sample of the national population, it may be deemed better to question practically everybody in representative areas. Thus the Department of Labor gathers consumer statistics by intensive checks in a few typical urban, small-town and rural communities. Because Erie County, Ohio, has a long history of agreeing closely with the national presidential vote, it has been studied carefully to trace the evolution of political opinions. The spot check makes possible the use of fewer interviewers, hence is more economical. It cannot be used where regional controls are needed.

Mass-Observation.—Before the close of this section on technical problems in opinion surveys, it is desirable to mention the "Mass-Observation" organization that has for several years been "taking the public pulse" in England.⁴ "Mass-Observation" includes such

¹ Fromme, A., On the Use of Certain Qualitative Methods of Attitude Research, *J. Soc. Psychol.*, 1941, 13, 429-459.

² Reported in Cantril, *op. cit.*

³ To control the possibility that this regular questioning may in itself change opinions, it is customary to set up two or more equated panels, only one being interviewed on every occasion. Cf. the Erie County study described on pages 341-343.

⁴ Madge, C., and Harrisson, T., *Britain by Mass-Observation*, Penguin Books, Ltd., Harmondsworth, Middlesex, 1939.

methods as listening to conversations on street corners, in taverns, and at sporting events; asking questions informally; counting the number and types of people doing certain things (praying in public, attending brutal sports events); collecting spontaneous essays, diaries, etc. These procedures have certain features to commend them: direct observation, freedom from verbal concealment. On the other hand, many will be displeased with the idea of deliberate eavesdropping, as the main method might be described. It is even more distressing, to those familiar with the pitfalls of public-opinion study, to note how casually the problems of stratified sampling, question phrasing, and other controls have been approached.

As far as the United States is concerned, it seems safe to predict that the development of polling will continue along lines already laid down: interviews rather than mail ballots; improved stratified sampling; formal rather than open-end questions, except for special studies; continuous statistical analysis to ensure that the obtained results are the most reliable possible.

VALIDITY

We can check the results of one poll against another, or of one type of question against another, to see that the answers agree. This is a measure of the extent to which the surveys are *reliable*. But one might still ask, "Do people act that way? Are the results valid?"

It could be argued that, if a person says he dislikes Communism, that is automatically a valid index of his personal opinion, since we cannot go behind his statement. But, as has been found since V-E Day in Germany, the most ardent Fascist can say he always disliked Fascism. The validity of a remark, therefore, ought to be measured by checking it against action.

In so far as voting is concerned, the validity of the scientific polls is amply proved. The margin of error on recent elections has been very small. It appears that, if a person says he is going to vote Democratic, or Republican, or Socialist, this can be accepted as a valid datum. There are still a certain number who prefer to say, "Undecided," but they constitute a sufficiently small group that they do not upset most poll predictions.

On issues where personal prestige might be involved (opinions about which emotion is quite strong), the findings are not so satisfactory. Schanck¹ reported that his subjects gave quite different opinions, speaking as private citizens, from those they put forth when

¹ Schanck, R. L., Study of a Community and Its Groups and Institutions Concealed of as Behaviors of Individuals, *Psychol. Monogr.*, 1932, No. 195.

speaking as church members. Apparently we get a great deal of this in governmental circles, when a man admits privately that the official administration policy seems foolish to him yet defends it in public. In these cases we should have to distinguish between *public* and *private* opinions.

On matters where self-respect is involved, the results of opinion polls are also likely to err. Hyman¹ reports two significant observations. From war-plant payrolls he got names of recent absentees, and, in the course of an opinion poll about such issues, worked in the question, "Have you missed work recently?" A considerable percentage (up to 23 per cent in one group) replied falsely. Using a list of names of people who had redeemed war bonds, he contrived to ask, "Have you found it necessary to cash any bonds?" The results show an interesting pattern.

Of those above average in economic status, 43 per cent said no.

Among those of average status, 25 per cent said no.

Among the poor group, only 7 per cent said no.

In this case, it seems clear that those in the better economic categories did not wish to confess that they had redeemed bonds, whereas the poorer citizens saw no reason to deny their plight. Poll results probably are not valid where the giving of a specified response would expose the respondent to an accusation, or even a feeling, that he had lowered his personal status by so doing.

In most instances, by the very nature of *public* opinion data, such answers are not involved. Thus, the evidence favors the view that surveys not relating to an election are about as valid as the surveys that predict election returns so accurately. The British Institute of Public Opinion, for example, could have foretold the 1945 general election in Britain rather accurately by a study of poll data on such questions as housing, nationalization of natural resources, and the like. And in elections involving a referendum vote by the public on a specific issue, the opinion polls have given very accurate forecasts.

With a few exceptions, therefore, it seems possible by modern scientific methods to obtain in a few days a reliable and valid index of public opinion on any topic that has been widely discussed. It is not reasonable to conclude from this that opinion polls should replace Congress as a means of deciding national policy. Elected officials are expected to study issues carefully and thus to be better informed than the electorate. They should consider the opinions of the public, as revealed through orthodox polls, and be influenced but not blindly led

¹ Hyman, H., Do They Tell the Truth? *Publ. Opin. Quart.*, 1945, 8, 557-559.

by the results. This, interestingly enough, is the belief of the average citizen¹ and of elective officials.²

DETERMINANTS OF OPINION

To what extent does the widespread questioning of individuals by the polling process throw light on the real determinants of opinion? Each person is likely to assert that his opinions are based on his own personal experience, contacts with friends, and reasoning. As psychologists we are well aware of the uniqueness of the individual. How, then, can statistical averages give valid information about these opinions? For every opinion must be held by an individual; the public exists only statistically.

The facts seem to answer unequivocally. Regardless of the assertion by each individual that his opinion represents his reasoned conclusion (or words to that effect), it is clear that such factors as the amount of economic security he has, the amount and kind of education he received, the section of the country he inhabits, and other items have profound influences upon his opinions. These factors are not matters of reasoning. But they do affect the manner in which we reason, the arguments we accept, the conclusions we endorse.

Education.—The most consistent group differences on opinion polls are those found when respondents are classified by educational level. Persons with some college training differ most sharply from the general trend. Those limited to grammar school, in general, are more nationalistic, more traditional, in their public opinions than the average. College-trained citizens are much quicker to accept the need for a world organization; they are less deceived by the theory that war is inevitable; they are more critical of harsh peace terms. In a comparison with experts on the causes of war, the college-educated came closest to endorsing the program set up by the experts as a means for approaching permanent peace.

It is easy to see why these differences in opinion would develop. Not only does the person of higher education have more facts upon which to base his judgment; he also has a different background of experience with reality. He has grown up (on the average) in a protected environment; he comes most often from a well-to-do family; and he has been less forced to concentrate on the day-to-day job of earning a living. Add to this the superior intelligence of the average person going to college, and the result necessarily is a different point of view

¹ Goldman, E. F., Poll on the Polls, *Publ. Opin. Quart.*, 1945, 8, 461-467.

² Hartmann, G. W., Judgments of State Legislators concerning Public Opinion, *J. Soc. Psychol.*, 1945, 21, 105-114.

on public issues. Breadth of vision, a consideration of factors beyond the immediate present, is a major consequence. Opinions of the college-trained allow more for the needs and wishes of people in other countries—not necessarily less selfish but more realistic about such international relationships. An example is the following question asked by NORC in 1945:

If some kind of world orgaingingation is formed, which one of these things would you like to see?	College, per cent	High school, per cent	Grade school, per cent
The United States has the most to say about running it.. . . .	12	21	37
Britain, Russia, and the United States together have the most to say about running it.....	27	18	16
All the countries in the organization have about the same amount to say about running it...	47	52	34

Such findings of opinion polls suggest that, despite all the legitimate criticisms of our colleges, one end product of college education is a more intelligent and enlightened public opinion.

Economic Status.—Our daily lives are to a very substantial extent filled, to the exclusion of other interests, by economic activities. The need to earn a living is a major motive in the personality of the average adult. Thus, it is natural to expect—and find—significant differences between economic groups as to opinions. Such differences are of two kinds: occupation and income. It is generally found that business men, farmers, and domestic servants have very conservative views on economic issues; professional, skilled, and unskilled laborers being more to the left on such questions. Similarly, general economic status—having a high or low standard of living relative to the community average—determines many opinions.

It is easy to understand the millionaire's preference for sales taxes as against higher income-tax rates. Nor are we surprised when beef stockmen favor free trade in the abstract but want Argentine beef barred from the American market. Such opinions represent crude self-interest. It is more difficult to comprehend the housemaid's angry opposition to labor unions, or the bookkeeper's feelings on the subject of excess-profits taxes.

An adequate explanation of these instances in which whole groups of individuals express opinions clearly opposed to their personal economic welfare depends on more subtle psychological considerations. A majority of white-collar workers seem unconsciously to assimilate the attitudes of top management and to repeat opinions expressed by

these successful business men. One mechanism involved probably is that of *identification*: the clerk adopts the mannerisms, style of dress, and ideas of the boss. This presumably serves the need for a feeling of success, if only through fantasy. Another factor may be *unconscious learning*: the office employee must carry out certain policies to keep his job, and he inevitably begins to think of these as the right policies. (This is the basis of the success of much totalitarian propaganda.)

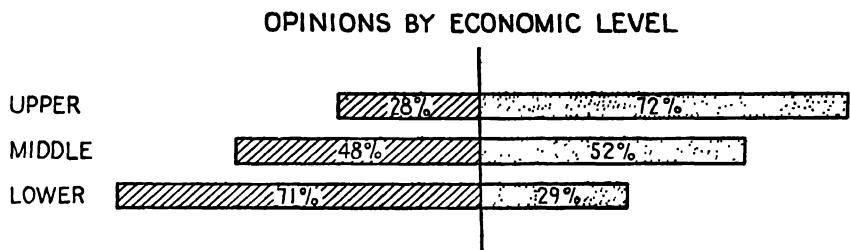


FIG. 40.—Opinions on government control of business as related to economic status. As income decreases, endorsement of postwar controls on business increases. (*Reproduced through courtesy of National Opinion Research Center.*)

Economic status, in the more general sense of standard of living, also is a potent influence upon opinion. This is particularly apparent in the case of public issues relating directly to economic conditions, as illustrated in Fig. 40. These results were in response to the question—When we *do* get back to peacetime conditions, do you think the American people will be better off if the government has *more* control or *less* control of business than it had before?

It is noticeable, however, that in many instances there are differences between economic groups on questions of no immediate economic significance. A Fortune poll on postwar treatment of Germany, for example, showed a decidedly greater proportion of poor people favoring very severe policies toward the Germans. One possible interpretation of this is that it reflects the greater degree of frustration—and, presumably, aggressive tension—among people at lower economic levels.

Marked changes in economic level, or in economic security, may be expected to produce drastic shifts in opinion. In 1928 Herbert Hoover was elected President by a landslide; in 1932 he was defeated by an even greater sweep. Admittedly the major intervening change was the economic collapse of 1929. Opinions about individual enterprise, social security, and related topics were completely revised under the impact of this catastrophe. A change of even greater significance for history was simultaneously taking place in Germany. In Fig. 41 is

charted the growth of the Nazi Party in members and in votes. From an insignificant minority in 1928 it changed to a powerful bloc, though never a majority, by 1932.

Education vs. Economics.—In most opinion surveys, the significant group differences have been found when people were classified by schooling or by economic status. Sex differences are commonly small, and religious differences are restricted to a few issues. It is thus natural for us to inquire which is more important, education or economic level.

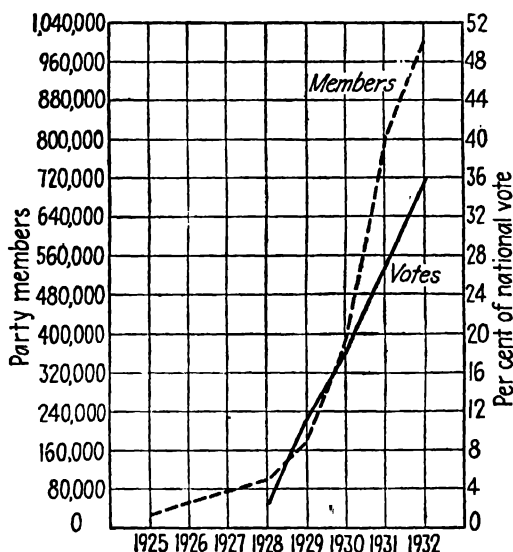


FIG. 41.—Effect of the depression on Nazi strength. From an insignificant minority in 1928 the Nazis rose to the point of polling approximately 40 per cent of the total vote in the last free elections in 1932.

An answer to this question will depend on the topics chosen. If we take simply a random sample of the issues submitted to the public by polling agencies and compare the differences by economic and educational level, it seems safe to say that education is more potent.¹ This is distinctly encouraging inasmuch as it suggests that the development of an intelligent public opinion is practicable through the extension of higher education.

We should also note that the total historical situation helps to determine the relative weight of economic status and education in determining opinion. Prior to 1941, public approval of President Roosevelt was closely related to economic level, very slightly to educa-

¹ See, e.g., results cited by Cantril, *op. cit.*, p. 207.

tion (see Fig. 42). With Pearl Harbor and the abandonment of class struggles to win the war, this sharp economic division disappeared, and by mid-1942 economic and educational differences on approval of the President were approximately equal. With this example in mind, we should remember to keep the total national (or world) situation in

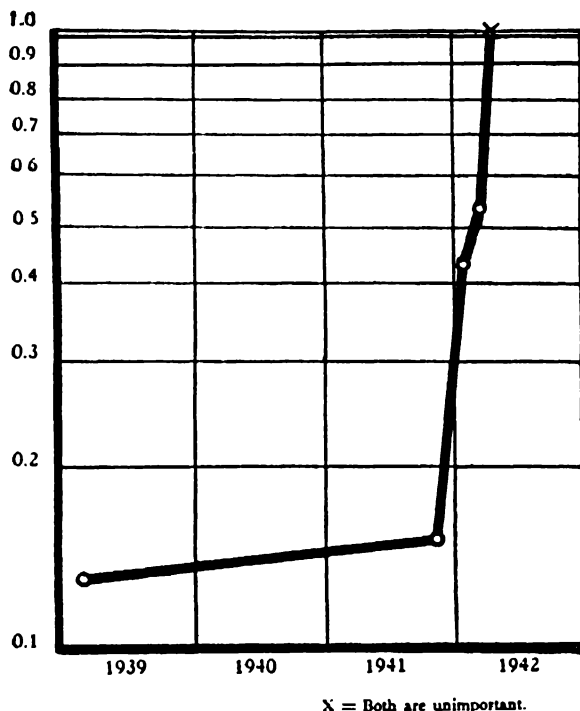


FIG. 42.—Impact of war on class attitude toward President Roosevelt. Prior to 1941 approval of Roosevelt was heavily determined by economic status; after Pearl Harbor the class factor became insignificant. Heightening of nationalistic feeling can reduce feelings of class conflict. (*Reproduced through Courtesy of Princeton University Press.*)

view as we assess the determinants of public opinion. In a crisis, traditional divisions of the public may be broken down—and new cleavages developed.

Cultural Area.—Inasmuch as this discussion is restricted primarily to opinions of the American public, no attempt will be made to consider geographical factors as they influence world opinion generally. It is worth noting, none-the-less, that opinion breaks sharply as we cross national frontiers. Americans customarily believe their nation to be the greatest and finest in the world, whereas Frenchmen prefer to

reserve such adjectives for France, Germans for Germany, and Russians for the Soviet Union. Such cleavages, it is unnecessary to remark, are purely due to training, not to heredity.

Even within the United States, differences according to area are of considerable significance. The Solid South is the traditional example of a region characterized by extreme race prejudice, by relatively high militarism, opposition to labor unions, and general conservatism. It would, of course, be just as fair to point to the Middle West, with its isolationist tradition and suspicion of our European Allies. (Like the Southern prejudices, these attitudes are rapidly yielding to the pressure of events.)

It is easy to understand that a child reared in a wealthy home unconsciously absorbs the attitudes and opinions of his elders, which in turn are determined largely by economic self-interest. Much of the child's learning is preverbal; much of it is based on imitation of admired adults. The scornful tone of voice, the smile of approval, the shrug of indifference are potent influences on opinion but are rarely if ever recognized as such.

In the same manner, prejudices and taboos that are regionally distributed are handed down from parent to offspring. Horowitz,¹ in his excellent study of prejudice against Negroes in the South, finds that these antagonistic attitudes are largely indoctrinated by unconscious teaching and learning. Parents denied telling their children that Negroes were bad in any way; yet the children stated that parents did not want them to play with Negro children. Horowitz found compelling evidence that the parents unconsciously communicated prejudice through facial expressions, tones of voice, and other non-verbal mechanisms. The children thus acquired an unfavorable opinion of the Negro race without being deliberately taught this.

The developmental history of this traditional attitude is instructive as a starting point for understanding other established opinions, such as nationalism, occupational preferences, religious and political faiths. Horowitz found race prejudice to be very rare before the age of five years. In the early school grades, prejudice is likely to be an all-or-none reaction and is verbalized as "Negroes are bad, cruel, no-good." In adolescence, the white children reveal the customary stereotype of the Negro, in which a certain number of good traits (humor, music, etc.) are ascribed along with less desirable features.

These observations fit rather closely with those on the development

¹ Horowitz, E. L., Development of Attitude toward the Negro, *Arch. Psychol.* N.Y., 1936, No. 194.

of other attitudes on public issues.¹ It would appear permissible to conclude that, in a class or area in which certain opinions are held by the majority of adults, these opinions are passed on to children through these mechanisms. The earliest stage in the development of an opinion regarding any psychological object would seem to be a generalized reaction of approval-disapproval. Later, this indiscriminating response becomes differentiated into judgments on separate aspects of the object. In many cases, of course, even this later stage is merely blind parroting of established views rather than a thoughtful evaluation of the situation. Education has by no means solved the problem of inducing thoughtful consideration of all major issues. In some cases the adult community even imposes legal restrictions² on the freedom of educators to carry out this responsibility.

Emotion.—An adequate prediction of the average man's opinions on any public issue can be made, based on such objective considerations as his economic level, his schooling, his religious affiliation, and the region in which he spent his childhood. Such predictions might at present attain an accuracy of 90 per cent on widely discussed issues.

Nevertheless, there are exceptions. Some wealthy young men become Communists. Some Southerners crusade for job equality for Negroes. Sons of flag-waving patriots occasionally become ardent internationalists. In these cases we look for emotional determinants.

It has been shown by Lasswell³ and confirmed by many investigators, that the boy's attitude toward his parents may be a decisive influence on his public opinions. All of a group of labor agitators studied by Lasswell had intense antagonisms to their fathers; in many cases this hostility was unconscious. Studies of college students have revealed a tendency for boys with close relationships to their parents to be nationalistic; those who felt relatively distant from their parents were more international-minded. In such cases we find evidence that the parent is a sort of symbol of authority, of the power of the nation. Rejection of parental authority may lead to rejection of the economic or political system that the parents represent.

Under our present setup, an overwhelming majority of the public have their ideas determined for them by accidents of birth, occupation,

¹ See, e.g., Horowitz, E. L., *Some Aspects of the Development of Patriotism in Children, Sociometry*, 1940, 3, 329-341.

² Thus the State of Tennessee not long ago forbade the discussion of the theory of evolution in the schools; and teachers in the District of Columbia once were forbidden to mention the word "communism" in class. Even more numerous are the unwritten taboos that teachers must observe to keep their jobs.

³ Lasswell, H. D., *Psychopathology and Politics*, University of Chicago Press, Chicago, 1930.

and education. A few reflect accidents of family emotional conflict. The man who has reached a position on any public issue by pure logic and reasoning is rare indeed.

PROPAGANDA

In the foregoing discussion, nothing has been said about the power of propaganda to mold public opinion. This omission was deliberate. Actually, the power of propaganda has often been overrated. Following the First World War there was a period during which propaganda was rather hysterically blamed for exaggerated evil deeds.

There are two circumstances in which propaganda is a true determinant of opinion: one, when a new issue arises for which family tradition or economic self-interest offers no obvious judgment; and two, when crisis conditions have destroyed our emotional adherence to traditional opinion.

When a situation is not clearly structured—when a person does not have, either from personal experience or from his training, a clear interpretation of what is happening—propaganda has an excellent opportunity. Thus, *e.g.*, propaganda about the bestial qualities of our enemies in wartime is highly successful, since few of us know people of the enemy nation, and the other side of the story is suppressed by censorship. But propaganda against inflationary buying and trading with the black market, which impinges on crystallized opinions of economic selfishness, is not nearly so potent.

There are certain emotional factors that help along such hostile propaganda as that just mentioned. In wartime, the civilian has many aggressive tensions bottled up that cannot be released in action. Thus he is particularly predisposed to accept propaganda that helps him project this aggressiveness onto others and see them as full of deadly designs on him. If he has any guilt feelings about the destruction rained on the enemy by his own nation, the guilt is alleviated by overstressing the horrible character of the enemy people.¹

Another common human characteristic that facilitates this functioning of propaganda is a need to avoid uncertainty. Tense situations with unpredictable outcomes make us uncomfortable. A complex

¹ It is probable that the differences in opinion between educated and uneducated groups (see above) are due in considerable measure to the greater susceptibility to propaganda found among poorer, illiterate people. An instructive analysis of this problem was made in connection with the famous radio broadcast of a Martian invasion, which threw a not inconsiderable number of persons into panic. Susceptibility was found closely connected to low economic and educational status and presence of emotional tension. See Cantril, H., *The Invasion from Mars*, Princeton University Press, Princeton, New Jersey, 1940.

catastrophe such as the great depression may be understood only in terms of numerous conditions, but minds of limited intelligence and education are not satisfied by such ambiguous explanations. A clear, simple formula is needed. Thus the success of propaganda placing the blame on Wall Street, inventors, the Communists, the capitalists, and so on. In Germany the Nazis sold the idea that the depression was caused by the Versailles Treaty, the Jews, and the Communists. In times of uncertainty, propaganda can be effective in controlling opinion.

A second type of situation making propaganda effective is that in which traditional opinion has been proved unreliable. Such is the revolutionary situation that arose in Russia in 1917. Belief in the sovereignty of the Czar, the rights of private property, and the necessity for waging war against the Germans led the Russian people only to defeat, hunger, and despair. Under these conditions a wave of anger and disillusionment brought about the rejection of traditional attitudes. The Bolsheviks, with a well-planned propaganda campaign, deflected public opinion into a revolutionary channel. The same thing happened in Germany in 1918, but the Social Democrats did not exercise the iron censorship and continuous propaganda that enabled the Russian regime to keep power.

Even in the absence of such intense emotional crises as those mentioned, propaganda probably successfully molds opinion if there is no counterpropaganda and if it fits in with childhood conditioning. The Nazis built up a tremendous propaganda machine precisely because they were not sure public opinion was with them. By barring all conflicting ideas and hammering home certain statements continually, they built favorable opinions or prevented hostile opinion from crystallizing. Some of their slogans, such as the superiority of German culture, fitted in with traditional opinion and were widely accepted; others, such as the race theory, seem never to have gotten any attention outside of inner-party circles.

PROPAGANDA AND THINKING

If we are to understand the nature of public opinion, both as shaped by early childhood experiences and as patterned by propaganda, we must inquire into the nature of the thought processes that determine it. Public opinion today reflects in varying degrees the impact of two kinds of thinking: realistic and animistic.

Realistic thinking is based on observable facts and scientific principles of logic. Most of our opinions about the physical world are formed in this manner. We are reasonably certain that automobiles

run because gasoline is exploded inside the cylinder by an electric spark. When the desired results do not appear, we do not blame mysterious supernatural forces or the malice of our enemies. Instead, we examine the fuel and ignition systems.

Animistic thinking is primarily emotional and subjective. Many of our opinions about political and economic institutions, as about human behavior in general, are determined animistically. No one would imagine that we could cure an automobile of defective performance by putting it in jail, but this irrational method of dealing with human beings is utilized daily. Scientists would not presume that the controversy between the wave theory and the quantum theory of light meant that advocates of one were a menace to the advocates of the other. But advocates of Communism and capitalism automatically assume that each is a threat to the other; and in so thinking they tend to make this tragic assumption a reality!

We have progressed past the stage of thinking about wind, lightning, and rain in terms of spirits. But we have not achieved a similar level in our consideration of economic cycles, immigration, international trade and similar human interactions. Propaganda that seeks to appeal to animistic thinking about foreigners, persons who threaten our comfortable existence, or anything strange and unknown, may be effective.

Public opinion, of course, is always a composite of both realistic and animistic thinking. Opinions of Whites about Negroes (and vice versa) are partly realistic, mostly animistic. Public approval of the new international organization to preserve peace is partly realistic, but in considerable degree it is purely wishful thinking. When issues arise requiring the sacrifice of treasured American prerogatives, much of this approval may fade away. If based upon a sounder appraisal of real conditions, it might survive such blows.

This leads to the suggestion that there are two kinds of propaganda, one seeking to stimulate realistic thinking, the other appealing to animistic tendencies. (Any given bit of propaganda may of course do both.) In so far as science recognizes good and bad phenomena, we may say that propaganda based on realistic analysis of conditions is good, while that which seeks to explain a situation in terms of spirits, human malice, and similar intangibles is bad. A careful analysis of the tangible conditions existing in Japan just prior to the invasion of Manchuria would prove highly beneficial in forming a realistic public opinion about the Japanese people; whereas an analysis in terms of alleged inherent brutality and similar intangibles can lead only to desperate confusion.

Other Psychological Mechanisms.—It has been pointed out that propaganda is more effective if it appeals to certain psychological needs, such as that for the release of aggressive tension in wartime or for a simple formula to explain a complex situation. To round out this discussion, it is worth while to mention some other psychological mechanisms that may be involved.

In a competitive world, most of us develop a need for success, in the form of wealth or power. Failing to achieve this through personal effort, we may be encouraged to *identify* ourselves with a powerful nation or with a political movement. (Some of Adolf Hitler's speeches are excellent applications of this principle.) Much propaganda is subtly calculated to develop this identification of self with a particular group.

Propaganda that seeks to establish opinions of a socially disapproved character (*e.g.*, advocating violence in some form) may make use of the tendency to *projection*. The propagandist points out that the enemy is about to resort to violence against us; we project our own hostile impulses onto him and see that he is really worse than we; and therefore it is permissible to attack him. This is readily observable in capital-labor conflicts, as well as in the field of international relations.

Many of us have impulses to act along socially disapproved lines but are kept in check by childhood training and conscience. By furnishing a plausible *rationalization* for acting, the propagandist may influence our opinions and behavior. Many German business men wanted to profit by seizing competing Jewish businesses. The Nazi propagandist furnished an excuse with his fabrication of a Jewish plot against the welfare of the nation.

EFFECTIVENESS OF PROPAGANDA

The statement has already been made that it is easy to overestimate the effectiveness of propaganda. We should not wish on that account to swing to the opposite extreme and underestimate its importance. We have shown that on issues that are confused and confusing to the average man, the suggestions he receives from press and radio may decide his opinions for him. There are many such issues these days. We have also pointed out that special emotional factors may predispose a varying number of persons to act on propaganda for a given policy. At times this number may be sufficient to influence the course of history.

Unfortunately, the experimental studies on the influence of propaganda are entirely inadequate to demonstrate the exact extent and

limitations of its effects. Most of the investigations have been conducted in classrooms, by having students listen to a prepared speech or read a statement on a given topic. Only a single presentation is customary, in contrast to the barrage encountered in real life. Little use has been made of emotional approaches, whereas human emotion is the basic raw material of the skilled propagandist. An exception to this general criticism is the well-planned study by Hartmann¹ on the emotional and rational appeals in propaganda. Carefully prepared leaflets were distributed to selected wards of a Pennsylvania city during an election campaign. Lack of finances and the handicap of running under a Socialist label prevented the study from obtaining very striking results, but a slight difference suggested the superiority of the emotional approach.

Various studies, such as that of Annis and Meier² and one by Chen,³ reveal that significant differences in opinion can be produced by single items of propaganda.⁴ The Annis and Meier technique, involving the preparation of faked editions of the student newspaper, was worthy of better application. An interesting observation by Bode⁵ was that different types of propaganda might have the same effect. Bode showed adult groups two films on labor problems, one from the conservative and one from the liberal viewpoint. Both films produced greater liberalism on the questions involved! An interestingly parallel finding comes from Remmers⁶ work with high-school students. Material favoring more government control of farming produced the expected change in opinion of city children but had a negative effect on attitudes of farm children in the same school. Propaganda, therefore, does not always follow the intent of the propagandist.

¹ Hartmann, G. W., Field Experiment on the Comparative Effect of "Emotional" and "Rational" Political Leaflets in Determining Election Results, *J. Abnorm. Soc. Psychol.*, 1936-37, **31**, 99-114.

² Annis, A. D., and Meier, N. C., Induction of Opinion through Suggestion by Means of "Planted Content," *J. Soc. Psychol.*, 1934, **5**, 65-81.

³ Chen, W. K., Influence of Oral Propaganda Material on Student Attitudes, *Arch. Psychol.*, N.Y., 1933, No. 150.

⁴ A suggestion that a single Roosevelt "fireside chat" may have influenced opinion significantly is contained in one AIPO report. On Dec. 29, 1940, the President broadcast to the nation on the "lend-lease" idea and America's stake in the European conflict. Of those who, interviewed a few days later, said they heard this speech, 71 per cent thought we should help England even at the risk of war, whereas the percentage of support for that alternative among Roosevelt voters a week earlier was only 62. An increase of 9 per cent would be quite significant.

⁵ Bode, B., An Experiment in Propaganda, *J. Adult Educ.*, 1941, **13**, 365-370.

⁶ Williamson, A. A., and Remmers, H. H., Persistence of Attitudes concerning Conservation Issues, *J. Exp. Educ.*, 1940, **8**, 354-361.

In contrast to these very small-scale studies, we have in the United States at periodic intervals an opportunity to study the effects of propaganda on a relatively enormous scale. In every national election campaign, the voters are deluged with a variety of appeals presented through an assortment of techniques. It might appear fairly easy to study these campaigns and determine the effectiveness of the various methods.

Unfortunately, any such investigation requires a great deal of money and a staff of well-trained investigators. Therefore, not many have been made. The best to date is that by Lazarsfeld and associates¹ on the 1940 presidential campaign. As it exemplifies the panel-type study excellently, the technique is given here in some detail.

In May, 1940, a staff of interviewers contacted some adult in every fourth house in Erie County, Ohio. This procedure assured the nearest possible to a true random sample completely representative of all districts. From the 3,000 interviews obtained, four panels of 600 each were prepared, equalized for economic, educational, political, and religious composition. One of these groups was reinterviewed in July, another in August, and a third in October, regarding their changes in voting intention. The fourth group, the main panel, was reinterviewed six times, about once a month, from May until after the election in November. A total of about 8,400 personal interviews was required.

The above procedure gives a base line showing the political intentions of the people prior to the beginning of the campaign. Lest frequent repeat interviews cause some to become self-conscious about politics and thus not act normally, the three control panels were given only one additional interview. The main panel provides the majority of the data, however, since detailed records could be obtained on speeches heard, magazines read, meetings attended, and so on.

It is striking to note that 49 per cent of these people reported no change in voting intent at any time. Their minds were made up before the candidates were nominated; the oratory of the campaign left them unmoved. 28 per cent changed from "no choice" in May to a definite preference, 14 per cent Democratic, 14 per cent Republican. A group of 15 per cent fluctuated in preference but eventually voted for their precampaign preference, leaving only 8 per cent of the people interviewed who actually switched their vote as a result of the campaign. This finding suggests that even a heavy barrage of propaganda need not necessarily be effective; an observation immediately qualified

¹ Lazarsfeld, Paul F., Berelson, B., and Gaudet, Hazel, *The People's Choice*, Duell, Sloan & Pearce, Inc., New York, 1944.

by noting that Democratic and Republican propagandas may have cancelled each other.

Even more striking, in the Lazarsfeld data, is the fact that the reaction of the undecided voters to partisan material can be predicted in advance. The authors demonstrate this as follows: in the original (May) interviews, it was found that Republican votes were concentrated among farmers, people of upper economic status, and Protestants; Democratic, among urban dwellers, lower economic status,

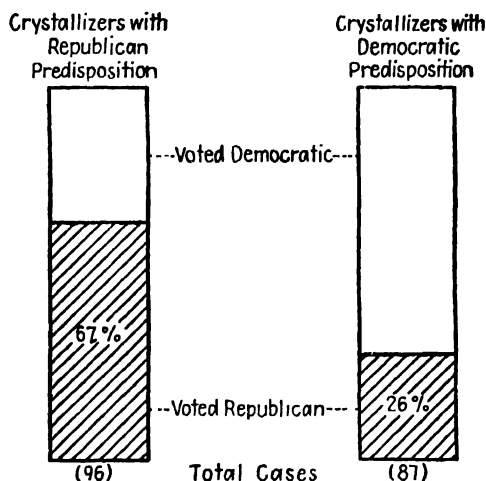


FIG. 43.—Predisposition to be influenced by propaganda. The same socioeconomic factors which distinguish Republicans from Democrats can be used to identify, with marked accuracy, those "undecided" voters who will be influenced by the campaign to vote Republican or Democratic. (Reproduced through Courtesy of Duell, Sloan & Pearce.)

and Catholics. By setting up point scores for these factors, they could compute an index of predisposition toward Republican or Democratic affiliation.

Now they computed this index for the 183 persons who were undecided in May. From this index, we could predict correctly the final vote of 70 per cent (see Fig. 43)! The same held true for an analysis of those changing party. Most of the party-changers moved to a position more in harmony with their occupation or economic standing.

This means that *in general* partisan propaganda, presented in this kind of situation, activates latent dispositions rather than inducing people to vote against their established habits. But if, for some reason, a person is subjected almost entirely to propaganda from one side, then the chances are he will vote that way (see Fig. 44). Thus

we must still make allowances for such situations as that in Nazi Germany, where one variety of propaganda has a monopoly. "Freedom for competing propagandas" is probably an essential of an intelligent public opinion.

The authors confirm another generally accepted maxim by pointing out that their Republicans systematically avoided Democratic propaganda, and vice versa. Thus, part of the ineffectiveness of pro-

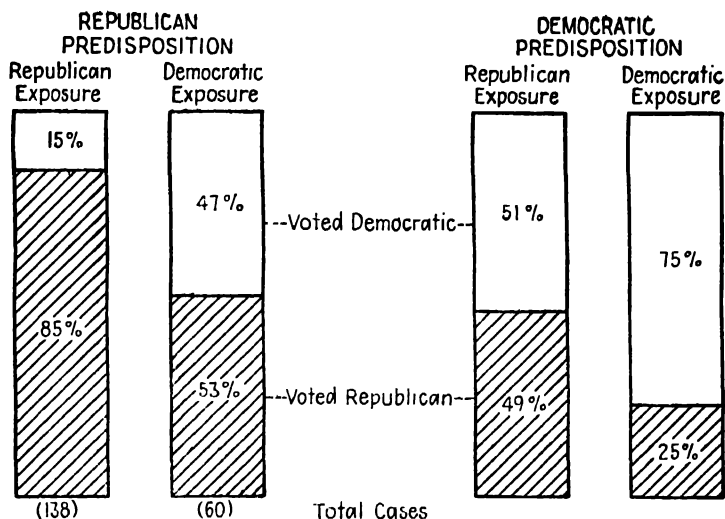


FIG. 44.—Effect of a relative monopoly of propaganda. When, by chance, a person is exposed almost exclusively to propaganda favoring one party, he is likely to be influenced in that direction despite the presence of factors predisposing to a vote for the other ticket. (Reproduced through Courtesy of Duell, Sloan & Pearce.)

paganda is due to the fact that it is heeded most by those already believing in it.

Propaganda and the Learning Process.—Lazarsfeld found that, when people are free to choose their reading and other material, they select items favorable to their established convictions and avoid that which might impel a change in opinion. Several recent investigations of the memory process, using material of a propagandistic nature, show that the mind may unconsciously accomplish the same function.

Edwards¹ tested students for attitude to the New Deal. He later presented to them a memorized speech carefully prepared to present an equal number of pro- and anti-New Deal statements. On a memory test, however, the students who disliked the New Deal remembered

¹ Edwards, A. L., Political Frames of Reference as a Factor Influencing Recognition, *J. Abnorm. Soc. Psychol.*, 1941, **36**, 34-50; Rationalization in Recognition as a Result of a Political Frame of Reference, *ibid.*, 224-235.

mostly critical statements, whereas those favoring the Roosevelt regime recalled the laudatory remarks. Further, there was a considerable amount of distortion, in that the speaker's words were twisted to fit the beliefs of the listener.

Levine and Murphy¹ required their subjects deliberately to attempt to memorize paragraphs favorable to and critical of the Soviet Union. Half the subjects were active Communist sympathizers, the other half vigorously anti-Communist. The learning and forgetting curves for

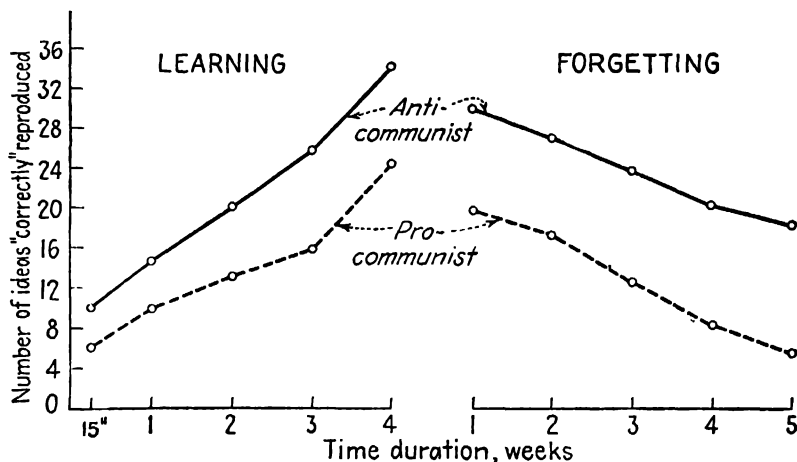


FIG. 45.—Learning and forgetting of controversial material. At each learning session, a paragraph strongly critical of Communism was read twice by each subject. After a 15-minute wait, he attempted to reproduce it. Successive sessions were one week apart. Forgetting sessions were identical except that no opportunity was given to reread the paragraph. (*Reprinted from J. Abnorm. Soc. Psychol.*, by permission.)

the paragraph hostile to the U.S.S.R. are shown in Fig. 45. It is clear that the material is learned most readily and remembered longest by the group liking it. The same observation can be made on learning and forgetting the material favorable to the Russians.

In the light of the preceding analysis, it will be seen that public opinion is a product of learning but that, in trying to have people learn his material, the propagandist is working against considerable odds. Most of the learning (on major issues) takes place in early childhood; people select their reading and radio material to get propaganda they already believe; and the chances are good that they will distort conflicting propaganda to make it seem to reinforce their established attitudes. To meet these handicaps, there have been developed a considerable number of propaganda tricks that merit our attention.

¹Levine, J. M., and Murphy, G., Learning and Forgetting of Controversial Material, *J. Abnorm. Soc. Psychol.*, 1943, **38**, 507-517.

PROPAGANDA DEVICES

It is necessary for the propagandist, in seeking to change opinion, to attract the attention of the person being propagandized and to make the changed opinion palatable to him. The problem of attracting attention is handled through the orthodox advertising techniques as worked out for newspaper advertising, radio, billboards, and the like. The task of making the proposed new idea acceptable is somewhat akin to the situation in advertising, but there are obvious differences relating to the intangible nature of the commodity being offered for sale. The techniques employed are therefore somewhat different. It is possible to classify them in many categories, but the following simple schema may be useful. It is the one developed by the Institute of Propaganda Analysis and therefore rather widely publicized before the war.¹

Name Calling.—One of the simplest and commonest devices is that of attaching unpleasant names to those who disagree with your views. Those who criticize labor unions are often denounced as "Fascists," while those who venture to defend human rights against property rights are called "Communists." This is substantially the same method as the "unpleasant smell" device in advertising.

That name calling is effective is proved by the experiments of Menefee² and Hartmann.³ Menefee asked his subjects to check a list of opinions with which they were to agree or disagree. Some weeks later the same opinions were presented, but on this occasion each statement was preceded by the label "A Fascist statement," "A Communist statement," etc. In this case people changed their answers to get away from approval of items called Fascist or Communist but increased their endorsement of "liberal" and "democratic" opinions. Hartmann found that 55 per cent of Pennsylvania adults approved of a majority of the planks in the Socialist platform, but very few of them liked "Socialist" as a name for a political party. He interpreted this as meaning that the label might deter many potential Socialist voters.

Transfer.—Transfer is employed when completely irrelevant pleasant or unpleasant ideas are introduced into propaganda in an

¹ For an excellent introduction to the work of this Institute, see Violet Edwards, *Group Leader's Guide to Propaganda Analysis*, Institute for Propaganda Analysis, Inc., New York, 1938.

² Menefee, S. C., Effect of Stereotyped Words on Political Judgments, *Amer. Sociol. Rev.*, 1936, 1, 614-621.

³ Hartmann, G. W., Contradiction between Feeling-tone of Political Party Names and Public Responses to Their Platforms, *J. Soc. Psychol.*, 1936, 7, 336-357.

attempt to have their influence spread to adjacent suggestions. Just as the beautiful girl has nothing to do with the quality of the cigarette advertised, so God, home, and the Star-Spangled Banner have nothing to do with the average politician's speech. Nevertheless, it is presumed that both tricks are effective.

Glittering Generalities.—The effectiveness of the use of glittering generalities depends basically upon transfer. A writer who opens his article with a belief in the rights of man and concludes that we must reduce the excess-profits tax on corporations is using glittering generalities. The attitude of approval that is set up by the broad generalization will, it is hoped, carry over to the specific opinion suggested later.

Testimonial.—The testimonial makes use of the prestige value of a person who has been cured by the patent medicine, or of someone who is alleged to be an expert on the topic at issue. Thus George Washington was quoted freely by both isolationists and interventionists in 1941. Often the expert has no qualifications whatever in the field under examination. A cosmic-ray expert is no authority on the validity of Socialist theory, and a mathematical genius is not an authoritative source of information about life after death. Nevertheless, famous names are used by propagandists everywhere for their testimonial value.

Several experimenters¹ have shown the value of this technique. The method involves obtaining the subject's opinions on one occasion, then later presenting the same statements of opinion with their alleged authors' names attached. The amount of shift to agree (or disagree) is a measure of the author's prestige value. On some items, the amount of shift is substantial.

Split-ballots on opinion polls² have shown that the inclusion of a specific person's name changes the poll data somewhat. Ascribing a proposal to the President increases the percentage of approval. During the Lend-Lease controversy in 1941, ascribing statements to Senator Burton Wheeler caused more people to reject them. The opponent of peacetime military training who quotes Adolf Hitler as the outstanding exponent of this idea is making use of reverse prestige or a negative testimonial.

Plain Folks.—Another technique that is quite similar to transfer is the plain folks device. The attempt is to make the idea pleasant by

¹ Cf. Lurie, W., *Measurement of Prestige and Prestige-suggestibility*, *J. Soc. Psychol.*, 1938, 9, 219-225.

² A split-ballot is used when half the people interviewed get a question in one form, the others receiving a slightly different wording; e.g., "Do you agree with the proposal . . ." versus "Do you agree with the President's proposal . . ."

setting it in a familiar, "homey" context. Presidential candidates often have their pictures taken in fishing clothes or pitching hay. Because of some overuse of this device by his publicity staff, Wendell Willkie was ironically referred to as "Wall Street's barefoot boy." If any insincerity is detected in this type of material, it is likely to do more harm than good.

Card Stacking.—The distortion of facts by presenting only those harmonizing with the propagandist's purpose is known as card-stacking. Wartime censorship always aids the corruption of public opinion by stacking the cards in one direction. However, even in normal times, the system of control of newspaper and radio now in effect in this country stacks the cards on many issues. Newspapers have refused to sell advertising to consumer cooperatives, and radio stations generally deny time to labor unions.

Card stacking may involve leaving out certain facts, stressing some while glossing over others, or outright falsification. With increasing public alertness, propagandists seem to have moved in the direction of less bald falsehood, more discreet evasion of inharmonious facts. It is, however, literally impossible for the average man to be competently informed on all major issues of national and international importance. And there is still some evidence to support Hitler's statement, "The bigger the lie, the easier to get people to accept it."

Bandwagon.—The last of these seven propaganda devices is that of the bandwagon. This is known in experimental psychology as the effect of majority opinion. Allard¹ polled students on various issues, then presented fictitious majorities from "national opinion surveys." Substantial numbers of students changed their minds to agree with the reported majority.

Most of us like the feeling of social approval that comes from going along with the majority. So, when the speaker shouts, "Jones will win by a landslide; vote for Jones!" many will go along. There does not seem to be much logic in voting for a candidate you dislike, merely because he is sure to win; nevertheless, many people confess to having done just that. No doubt the desire to avoid embarrassment in postelection conversations also plays a part in this behavior.

Effective propaganda is much more than a bag of tricks such as those outlined in the preceding pages. The purpose of the propagandist is to have his public learn certain new verbal responses. He must therefore appeal to their established interests and in almost all cases conform to existing habits rather than set up conflicting patterns.

¹ Allard, W., *Test of Propaganda Value in Public Opinion Surveys*, *Social Forces*, 1940, 20, 206-213.

(Hence, conservative propaganda always has an advantage.) He must try to show that his idea will, in the long run, lead to the satisfaction of basic motives. He may try to utilize existing widespread emotional states, such as insecurity, resentment, antagonism, or fear. The more of these dynamic factors he can mobilize, the stronger and more permanent will be the resulting opinion changes.

MEASURING THE PROPAGANDA ENVIRONMENT

In a certain sense, propaganda pervades all our media of public communication. Much of the material in our newspapers and on the radio is placed there deliberately for the purpose of influencing opinion, and perhaps even more fulfills the same function without deliberate intent.

This is not inherently an undesirable condition. Any attempt to shape opinion, whether for desirable or for undesirable ends, may be called propaganda. One essential of a democratic society is freedom of minorities to attempt by persuasion to convert the majority to their way of thinking. Freedom of propaganda is therefore an often-ignored but necessary freedom. Furthermore, as long as alternative opinions get reasonable representation, the public seems to do an independent job of making up its mind. It will be remembered that in the 1936 and 1940 elections the newspapers of this country were against Mr. Roosevelt by an overwhelming majority. The electorate was not swamped by this flood of Republican propaganda.

With regard to such questions as foreign affairs and novel or radical innovations in institutional practice, the question of adequate representation for all points of view may be far more important. On such topics we may have a virtual monopoly of propaganda, in that only a nationalistic or a conservative view is ever presented. The misrepresentation of the United States in the press of many foreign nations should be a warning to us that we probably are not getting a fair picture of our international neighbors.

Harold Lasswell has been most vigorous in urging the accumulation of systematic data on the direction and quantity of propaganda dealing with significant social problems. He and his associates have published a number of papers¹ outlining techniques for this purpose. Basically, the idea of a world attention survey would be to tabulate the major

¹ Lasswell, H. D., World Attention Survey, *Publ. Opin. Quart.*, 1941, **5**, 456-462; Janis, I. L., Fadner, R. H., and Janowitz, M., Reliability of a Content Analysis Technique, *ibid.*, 1943, **7**, 293-296; Lasswell, H. D., and associates, Politically Significant Content of the Press: Coding Procedures, *Journalism Quarterly*, 1942, **19**, 12.

ideas being held before the public of the greater nations, and to show if these ideas were treated positively or negatively. Such a survey might choose such basic concepts as Democracy, Communism, Fascism, Nazism and Socialism; the frequency of references to each in newspapers of wide circulation in the United States, Britain, Mexico, Argentina, etc., and the proportion of approving and disapproving remarks on each, would be tallied. The result would give us a realistic picture of the propaganda being presented in each nation.

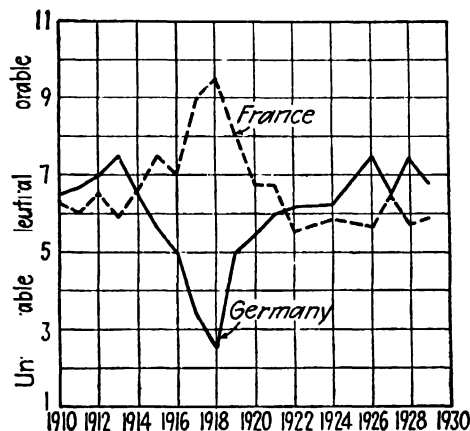


FIG. 46.—American newspaper editorials on France and Germany, 1910 to 1929. (Reproduced from *American Political Science Review*.)

An earlier and more limited example of the same type is the study by Russell and Wright¹ of newspaper editorials referring to specific foreign countries. One of their charts, reproduced here (Fig. 46), shows the relative approval of Germany and France in various newspapers in this country, 1910 to 1929. Only during the war years is there a real preponderance of propaganda.

Such an analysis of Russian and German newspapers in 1939 gives forewarning of the Nazi-Soviet pact of August, 1939, which was such a surprise to the Western democracies. It may be that a continuing project of this type would give the public (and the government) a sounder basis for predicting developments in international affairs. To the new United Nations Organization, such techniques offer a necessary first step toward the detection and control of war-breeding propagandas anywhere in the world.

The Lasswell technique is limited to a determination of the proportion of positive to negative propaganda on any given issue and aims at

¹ Russell, J. T., and Wright, Q., National Attitudes on the Far Eastern Controversy, *Amer. Pol. Sci. Rev.*, 1933, **27**, 555-576

extensive determination of such facts. White¹ has expanded this general approach by developing a method for the intensive analysis of specific propaganda materials (*e.g.*, Hitler's speeches). White has prepared a list of 125 basic value words, covering pretty adequately every human value to which a propagandist could appeal. He then has analyzed propaganda relating to a specific concept (*e.g.*, Russia) in terms of the frequency of reference to the various value words, the kind of relationship asserted or implied, and so on. This procedure would clearly be too cumbersome for broad propaganda surveys but might be highly informative in analyzing books, specially selected speeches or articles, and such items being circulated in our own or some other country.

Exposure Frequency.—A complete survey of the propaganda environment will have to include some estimate of exposure. We need to know what is being set before the people and also how many perceive it. Cantril and Lambert² found that only 43 per cent of the readers of a small-city daily newspaper noticed a full-page advertisement dealing with the causes of inflation, and only 10 per cent read it carefully. Different papers have different kinds of audiences, and of course, a given audience will prefer one type of approach to another.

Radio has established the basic technique with its popularity polls for programs. From such data it is possible to predict with considerable accuracy how many persons will hear a given announcement inserted in a network broadcast. It should not be too difficult to get at least satisfactory approximations of such facts about the major newspapers, the better known magazines, popular radio commentators, and similar opinion-molding sources. Given the content analysis of the material they issue and the size of their audiences, we have fundamental facts about our propaganda climate.

PUBLIC OPINION IN A DEMOCRACY

As we have noted already, there is no reason to suppose that opinion polls will take the place of Congress as a means of legislation. While there is a certain specious appeal to the idea that a majority of the public must be right, we must recognize that the majority can be wrong. On many issues, an opinion poll is a tallying of ignorance, misinformation, or prejudice. Nevertheless, each of those ignorant, misinformed, or prejudiced persons has a right to express his opinion,

¹ White, R. K., *Value-analysis: a Quantitative Method for Describing Qualitative data*, *J. Soc. Psychol.*, 1944, **19**, 351-358.

² Cantril, H., and Lambert, G. B., *Increasing Public Understanding of Inflation*, *J. Abnorm. Soc. Psychol.*, 1944, **39**, 112-117.

and that opinion ought to be considered by lawmakers as a significant fact.

Inasmuch as the bandwagon effect has proved to be a reality, the question of deliberate manipulation of poll data is often raised. Actually there has been surprisingly little evidence to indicate that anything of the sort has been attempted by the established polling agencies. There seems to be a good basis here, nevertheless, for opposing a poll conducted by the government. The method adopted in this country in the Second World War of employing private poll organizations to collect certain data, using their own established procedures, seems inherently safer. In the long run, of course, there is no guarantee against such manipulation except an alert and enlightened electorate—the same sole guarantee against all other political malfeasance.

The use of opinion and propaganda surveys suggests the possibility of certain improvements in the functioning of democracy. These would include publication of the fact that an excessive amount of propaganda along certain lines was appearing in a given medium, analysis by social scientists of the implications and probable results of such propaganda, and opinion polls on the topic. By enforcing freedom of propaganda, the government could ensure to the people the right to make up their own minds after hearing alternative views on a given issue. Intensive studies of individuals who issue (or who accept) antidemocratic propaganda could lead to suggestions for child training and educational techniques leading to a reduction in the number of such persons. These and many other applications will be developed as social psychology continues to make an ever wider contribution to our democratic civilization.

SUMMARY

Public opinion is composed of the opinions held by individuals on matters of common interest. While public opinion has always been important to government, whether democratic or totalitarian, it is only with the development of stratified random sampling that accurate estimates could be quickly made. Such surveys confirm the belief that public opinion is generally based on nonrational bases; early emotional conditioning seems to be very significant. It is encouraging to find that persons of higher education are more realistic in their thinking and that the educational factor outweighs other determinants of opinion.

Propaganda may be an effective influence on public opinion when (1) the situation is confused so that traditional prejudices do not determine the public reaction, or (2) a crisis has destroyed faith in traditional values. Propaganda is more likely to be effective if it (1) offers

an outlet for repressed emotion, (2) offers a simple explanation of a confused situation, (3) fits in reasonably well with traditional symbols, and (4) promises gratification to strong motives.

While propaganda is not a major determinant of public opinion in normal times, it may influence a decisive group of people, or in time of crisis it may bring about acceptance of new social ideas—either very desirable or very harmful to the community. A general understanding of propaganda and practice in analyzing it is thus socially valuable.

RECOMMENDED SUPPLEMENTARY READING

Public Opinion

BLANKENSHIP, A. B.: *Consumer and Opinion Research*, Harper & Brothers, New York, 1943.

CANTRIL, H.: *Gauging Public Opinion*, Princeton University Press, Princeton, New Jersey, 1944. (Technical.)

GALLUP, G.: *Guide to Public Opinion Polls*, Princeton University Press, Princeton, New Jersey, 1944. (Popular.)

LASSWELL, H. D.: *Democracy through Public Opinion*, George Banta Publishing Company, Menasha, Wisconsin, 1940. (Theoretical, stimulating.)

Propaganda

BLANCO WHITE, A.: *The New Propaganda*, Victor Gollancz, Ltd., London, 1938. (Popular.)

DOOB, LEONARD: *Propaganda*, Henry Holt and Company, Inc., New York, 1935. (Technical.)

FREEMAN, ELLIS: *Conquering the Man in the Street*. The Vanguard Press, New York, 1940. (Technical, vigorous.)

CRIMES CLASSIFIED

Crimes may be classified for purposes of analysis with regard to their putative seriousness. Thus *felonies* are the offenses the community regards as resulting in greater social injury and are more severely punished, while *misdemeanors* are violations considered of minor importance and are punished by fines or jail sentences. The specific application of the two terms varies from jurisdiction to jurisdiction and "the distinction is based on no valid or consistent principle. . . . The same acts are often misdemeanors in some states but felonies in others."¹ Other categories in such a classification might be treason, more serious than felony, and offenses less serious than misdemeanors, such as violations of municipal ordinances. A classification that should be useful to the student is suggested by Phelps. Using Rhode Island data he groups offenses into crimes against the person, against property, against sex morality, public order, etc., and miscellaneous offenses.²

THE CHANGING CONCEPTIONS OF CRIME

Specific crimes are defined socially and definitions change with changing conditions. Sumner suggested that offenses are violations of laws that are (1) *crecive* or (2) *enacted*.³ *Creecive* laws are those that have originated in folk experience and developed naturally from customs to formal laws. The community understands, approves, and enforces these laws largely by social pressure. *Enacted* laws are social inventions made to meet newly recognized or newly created needs for legal controls. In our rapidly changing culture, new situations having potential possibilities for social injury are constantly arising with which society has no prior experience. Because of their urgency we cannot afford to wait for public opinion to be organized about them, hence laws for their control are enacted. This type of law, little understood by the public and wanting strong social approval for its support, can be violated without loss of status. Such offenses are not thought of as crimes but rather as mere technical violations. Thus is created a new class of lawbreaking. This is one probable factor in the relative lawlessness of the population of the United States.⁴ While legislatures

¹ Taft, *op. cit.*, p. 19.

² Phelps, Harold A., *Contemporary Social Problems*, p. 551, Prentice-Hall, Inc., New York, 1938.

³ Sumner, W. G., *Folkways*, p. 54, Ginn and Company, Boston, 1906.

⁴ Sutherland says, "Opposition to law has been a tradition in the United States." Sutherland, Edwin H., *Principles of Criminology*, p. 31, J. B. Lippincott Company, Philadelphia, 1939.

RECORDED CRIMES CLASSIFIED BY TYPE

1. Against the person:
 - Murder
 - Manslaughter
 - Assault with dangerous weapon
 - Assault with intent to kill
 - Assault with intent to murder
 - Poisoning food
 - Assault and battery
2. Against property:
 - Breaking and entering
 - Larceny
 - Receiving stolen goods
 - Robbery
 - Assault to rob
 - Burglary
 - Having burglar's tools
 - Forgery and embezzlement
 - False pretenses
 - Blackmail
 - Extortion
3. Against sex morality, public order, and etc.:
 - Adultery
 - Rape
 - Assault to rape
 - Age of consent
 - Carnal knowledge
 - Nuisance
 - Exposing person
 - Selling obscene literature
 - Common gambler
 - Selling liquor to minor
 - Bigamy
 - Malicious mischief
 - Putting girl on exhibition
 - Attempt to commit sodomy
 - Crime against nature
 - Concealing birth
 - Abortion
 - Pandering
 - Seduction
 - Transporting for prostitution
4. Miscellaneous offenses:
 - Violation of game law
 - Practicing medicine without license
 - Disturbing religious meeting
 - Falsely impersonating agent of another
 - Obstructing officer
 - Lottery
 - Sunday sale of liquor
 - Sale of liquor by druggist
 - Perjury
 - Obstructing railroad track
 - Unlicensed victualer
 - Arson
 - Itinerant vendor
 - Selling diseased cow
 - Defacing building
 - Throwing stones at engineer
 - Attempt to escape from prison
 - Driving off horse
 - Impersonating officer
 - Destroying ballot
 - Illegal voting
 - Unlicensed boxing match
 - Unwholesome provisions
 - Boarding infants without license
 - Criminal libel
 - Ten-hour law
 - Counterfeiting money
 - Promoting policy
 - Conspiracy
 - Mayhem
 - Driving off automobile
 - Habitual criminal

grind out hastily conceived laws in an attempt to control every important phase of our scientific, competitive, machine-age culture (many of them unenforceable) court interpretations produce confusion, law enforcement lags, and violations multiply. The average citizen gets the impression that respectable people break any law that gets in their way. Hence law observance as a principle of good citizenship suffers and the conviction spreads that everybody is a lawbreaker and only the stupid and the unlucky get caught or, at best, that many of our laws are witless and outmoded and should be violated without any sense of guilt. This attitude suggests the changing nature of the social concept of crime as applied to specific behavior.

The concept of crime as a phenomenon of social change is illustrated in the following chart.

TABLE 110.—CONCEPTUAL CHART OF CHANGING DEFINITIONS OF CRIME IN A SPECIFIC CULTURE

Outgrowth of the culture of the <i>past</i>		Subject to cultural dynamics of the <i>present</i>		Products of new knowledge, beliefs, and conditions of the <i>future</i>
1	2	3	4	5
Former crimes	Obsolescent crimes	Contemporary crimes	Recognized "crimes" not yet prohibited by law	Future "crimes" not yet recognized
→		-----→?	-----	-----→?
			-----	-----→?
Unchanging crimes (?)				
-----→				

Beginning at the left in the chart under "1" are former crimes or acts once generally considered socially injurious or undesirable and hence prohibited or punished. All crimes in this group, in the theoretical society under consideration, are no longer so regarded (indicated by the check in the line dividing spaces "1" and "2"). The colonial blue laws are examples of this class. New knowledge and new beliefs have caused us to cease to enforce such laws although many of them have never been formally repealed.

In space "2" are obsolescent crimes or acts still thought of by the conservative part of the community as serious offenses but not so regarded by the "progressives." The dotted line extending from space "2" into "3" suggests that these acts may continue to be considered crimes by a part of the community for an indefinite period of time.

Those crimes that are currently accepted as crimes by the entire

law-abiding community are referred to in space "3." The dotted line from "3" through "4" and into "5" again suggests that some or all of these may continue indefinitely to be thought of as crimes.

New knowledge and changing conditions are producing the belief held by advanced thinkers that there ought to be a law covering crimes suggested in space "4." Many of these acts will be crimes under the law in the future and will continue so to be considered for an indefinite period extending into the future, as suggested by the dotted line from "4" into "5."

By the same reasoning, knowledge and conditions not foreseen by even the most enlightened today will in the future produce definitions of behavior that will be criminal at some future time.

Under "6" are the theoretically unchanging values which define acts that always have been and always will be crimes. Our cultural heritage includes the absolutist tradition that tends to perpetuate the attitude that right is right and wrong is wrong—and so it always has been. Modern social science, however, is demonstrating the evolutionary nature of ethical attitudes in human societies.

From the foregoing analysis it develops, then, that those persons in the community who lead in forming public opinion and translating it into legislation are constantly attempting, by the process of enacting new laws and revising old ones, to keep the criminal law up-to-date. This involves defining as crimes newly recognized forms of antisocial behavior and newly devised methods of defeating the spirit and purpose of existing laws. In a dynamic society like our own the lag in this process of keeping the laws abreast of the times is considerable and understandable.

Contemporary criminologists emphasize the extent of antisocial behavior that is not prohibited by law but results in greater social injury than much of recognized conventional crime. They call attention to the dependence of the professional criminal on the cooperation of respectable people.¹

Strictly defined, then, crime is a proved violation of existing law. Intention to do injury is not necessary nor does it always indicate a crime. Intention to break a law, however, is frequently important in establishing guilt in court. Actually, crimes are acts deemed injurious to society that are forbidden by law. The effective laws are to a degree determined by police and court officials who interpret and enforce

¹ See Sutherland, *op. cit.*, pp. 36-43; Taft, *op. cit.*, pp. 17-19; Tannenbaum, Frank, *Crime and the Community*, pp. 191-193, Ginn and Company, Boston, 1938; Barnes, Harry Elmer, and Teeters, Negley K., *New Horizons in Criminology*, Chap. 3, Prentice-Hall, Inc., New York, 1943.

from jails in many jurisdictions and a large part of the jail population is made up of older vagrants, beggars, "dopers," and "plain drunks" who are committed for short periods.

TABLE 114.—PRISONERS RECEIVED FROM COURT IN FEDERAL AND STATE INSTITUTIONS, BY TYPE OF COMMITMENT AND AGE, FOR THE UNITED STATES: 1942*

Age	Total	Felony commitments	Misdemeanor commitments
All ages	56,062	47,761	8,301
Under 15 years	25	19	6
15-19 years	8,554	7,311	1,243
20-24 years	12,358	11,521	837
25-29 years	8,921	8,273	648
30-34 years	6,995	6,335	660
35-39 years	5,967	5,007	960
40-44 years	4,379	3,539	840
45-49 years	3,259	2,294	965
50-54 years	2,328	1,469	859
55-59 years	1,546	958	588
60-64 years	858	462	396
65-69 years	423	251	172
70 years and over	241	140	101
Not reported	208	182	26
Median age	28.9	28.0	38.9
Median age, male . . . . .	...	27.9	42.0
Median age, female . . . . .	...	29.7	23.9

* Adapted from *Prisoners in State and Federal Prisons and Reformatories 1942*, Table 6, U.S. Bureau of the Census, Washington, 1945.

From Table 115 it is evident that there is not a trend, during the period covered, toward greater youthfulness of felons. But when the data on arrests assembled by the Federal Bureau of Investigation are examined the trend is reversed. This is to be accounted for in part by the removal, after 1941, from the civilian population of large numbers of men in the age groups above twenty-one by induction into the armed forces leaving a relatively large proportion of all offenders in the younger age groups. It may also be a reflection of war hysteria¹ taking the form of a drive to increase agencies and accentuate the apprehension of young offenders. Such activities would of course not affect the statistics of commitments of those convicted of serious crimes.

¹ Rogers, D. B., A Reflection of "Expert Opinion" on Juvenile Delinquency in Wartime, *The Eleusis of Chi Omega*, February 1, 1945, pp. 49-53.

It has been the custom to consider children exempt from the degree of responsibility exacted of adults before the law. Under common law a child under seven, being incapable of criminal intent, could not commit a crime. He was assumed to be fully responsible after age fourteen. The courts commonly based their decisions on the degree of *mens rea* (guilty mind) supposed to be involved in cases of children between the ages of seven and fourteen. Table 116 shows how the age of responsibility varies from country to country. Children are considered mature at earlier ages in more of the southeastern European countries with milder climates than in those of northwestern Europe.

TABLE 115.—MEDIAN AGE OF FELONS RECEIVED IN FEDERAL AND STATE INSTITUTIONS: 1938-'942

	1942	1941	1940	1939	1938
Median age.....	28.0	28.2	27.9	27.6	27.7
Most frequent age of criminals arrested.....	18	19	19	19	21

TABLE 116.—MINIMUM AGE OF RESPONSIBILITY BY COUNTRIES*

9th year	10th year	12th year	14th year	15th year	16th year	21st year
Spain	Bulgaria Greece Austria Poland Uruguay	Switzerland Hungary	Germany Denmark Norway Czechoslovakia	Finland Sweden	Belgium	California

* Elmer (Strong), Anna June *The Relative Occurrence of Specific Crimes in Various Age Groups*, Master's Thesis, University of Pittsburgh (1937) p. 6, quoting G. von Mayr in *Statistik und Gesellschaftslehre*, Handwörterbuch der Kriminalogie, p. 23, Leipzig (1932).

In general, crimes in which violence or the threat of violence is involved are committed by young offenders. Prevalent are robbery, burglary, larceny, and auto theft. Drunkenness, disorderly conduct, and petty larceny are found at all ages. The crime rate declines rapidly after the age of forty. Older offenders are usually implicated in cases of embezzlement and fraud, while a disproportionate number of men over fifty are charged with sex offenses.

For every female prisoner incarcerated in State and Federal prisons, in 1942, 21 males were committed. Males and females are about equal in number in the general population. The overrepresentation of men in prison is largely the result of cultural differences in the social roles of men and women. Men are supposed to be aggressive, com-

petitive, and sensitive to challenges to their honor and to defend it, if need be, by manly resort to physical violence. Theirs is the role of provider. A good man may be expected to steal, if necessary, to feed his family. Men compete for the favor of women by lavishing them with gifts and entertainment. Much of the crime committed by men is motivated by the desire to please or impress women.

When compared with those of females (see Table 113), male crimes are proportionately higher for robbery, burglary, auto theft, embezzlement and fraud, rape, and violating liquor laws. Offenses ranking higher among women than men include murder, manslaughter, aggravated assault, receiving stolen property, commercialized vice and other sex offenses, violation of drug laws, and nonsupport and neglect.

Men commit more crimes than women, but when women do run afoul of the law it is usually for highly emotionally motivated offenses, frequently involving physical violence. This is a natural consequence of the relatively repressed role required of them. There is no evidence that female crime is different in emphasis from that of males because of any inherent or biological differences between the sexes, except those that give them a different place in our society.

NATIVITY AND RACE

In proportion to their number, the part of our population who are native-born commit more crimes than those who are foreign-born. Studies of crime rates of the children of foreign-born parents indicate that they have higher rates than the native-born in industrial cities and, especially, in those where most of the foreign-born are of the "new immigration." For example, Donald A. Taft reports that in 1933 they had higher rates in nine states, while in 26 states the reverse was true.¹ The clue to the social maladjustment of this group is to be found in their unsatisfactory economic and social situation in the community.

If the class, "other offenses," had been included in Table 117 it would have ranked first among offenses for which the foreign-born were committed. Most of these cases are violations of immigration laws. For this group, violations of National Defense laws, violation of liquor laws, and larceny ranked second, third, and fourth. Murder and manslaughter, contrary to popular opinion, were thirteenth and fourteenth in rank.

Negroes, with 30 per cent of all admissions to penal institutions in 1942, had three times the rate their proportion of the total population would indicate. Of all Negro offenses, burglary ranked first, with 20.0 per cent of the total, larceny second, with 17.7 per cent, robbery third,

¹ Taft, Donald A., *Nationality and Crime*, *Amer. Sociol. Rev.*, 1936, Vol. I, No. 5.

with 10.6 per cent, and violating liquor laws fourth, with 10.4 per cent. Rape had the same rank order position (ninth) for Negroes as for Whites. For the Negro group, it constituted only 3.3 per cent of all offenses, while for the white population it was 4.0 per cent.

TABLE 117.—MALE FELONY PRISONERS RECEIVED FROM COURT BY OFFENSE, RACE, AND NATIVITY, FOR THE UNITED STATES: 1942*

Offense	Native		Foreign-born		Negro	
	Rank	Per cent	Rank	Per cent	Rank	Per cent
Larceny, except auto theft.....	1	17.5	4	7.4	2	17.7
Burglary	2	15.3	7	4.4	1	20.0
Auto theft.....	3	8.9	15	1.5	8	3.5
Forgery.....	4	8.1	10	3.7	11	2.4
Violating liquor laws.....	5	7.7	3	9.4	4	10.4
Robbery.....	6	7.6	11	3.5	3	10.6
Violating National Defense laws.....	7	4.6	2	18.4	12	2.3
Embezzlement and fraud.....	8	4.4	9	3.9	14	1.0
Rape.....	9	4.0	12	3.3	9	3.3
Aggravated assault.....	10	3.9	6	4.8	5	9.9
Other sex offenses.....	11	3.1	8	4.1	15	.9
Violating drug laws.....	12	2.4	5	5.7	10	2.5
Murder.....	13	2.1	13	1.9	6	6.1
Manslaughter.....	14	1.8	14	1.8	7	4.4
Nonsupport or neglect	15	1.4	18	.7	16	.6
Stolen property.....	16	1.1	16	1.2	13	1.2
Commercialized vice	17	1.0	17	.9	17	.5
Violating traffic laws	18	.4			18	.2
Carrying and possessing weapons	19	.3	19	.3	16	.6
Other offenses†						

* *Prisoners in State and Federal Prisons and Reformatories* 1942, Table 35 (adapted), U.S. Bureau of the Census, Washington, 1945.

† The class "Other offenses" in the original table was omitted because the nature of the crimes included is not given.

Many factors contribute to the relatively high Negro crime rate. They are arrested where others would be warned, "bawled out," or ignored by the police. When arrested they are more frequently held for trial and convicted. When convicted they are given more severe sentences. Fewer Negroes than Whites, when arrested, are able to pay fines as an alternative to commitment to an institution.

The difference between the crime rates of Negroes and Whites would be less if the Negro's status in our society were such as to give him security and self-respect. Unstable home and family life,¹

¹ Elmer, M. C., *The Sociology of the Family*, p. 352, Ginn and Company, Bos-

exposure to criminal influences in the slum areas he is forced to occupy,¹ and exclusion from responsibility for public administration of the social controls have deprived the Negro of social and psychological influences that operate to make the white population less in danger of arrest and conviction of crime.

MARITAL STATUS AND CRIME

Census reports of the prison population, when analyzed in relation to the general population, indicate the importance of marital status as a selective factor in adult crime. Divorced, single, widowed, and married rank in the order named in relative frequency of commitment to prison. Divorced females twenty to twenty-four years of age have the highest rate, which is "10.4 times as high as single females and 9.3 times as high as married females of the same age."² Table 118

TABLE 118.—FELONY PRISONERS COMMITTED TO PENAL INSTITUTIONS COMPARED WITH THE GENERAL POPULATION BY MARITAL STATUS AND SEX, FOR THE UNITED STATES: 1942
(Per cent)

Marital status and sex	Prisoners*	General population†
Male, total	100	100
Single	51.6	33.2
Married	40.8	61.2
Widowed	2.3	4.3
Divorced	5.3	1.3
Marital status not reported		
Female, total	100	100
Single	27.4	25.8
Married	53.7	61.0
Widowed	11.1	11.5
Divorced	7.9	1.7
Marital status not reported		

* From *Prisoners in State and Federal Prisons and Reformatories*, 1942, Table 22, U.S. Bureau of the Census, Washington, 1945.

† U.S. Census, *Population*, 1940.

shows the divorced to be overrepresented for both male and female prisoners. Single males are proportionately much more overrepre-

ton, 1945. See E. Franklin Frazier, *The Negro Family in the United States*, pp. 362-368, University of Chicago Press, Chicago, 1939 for a discussion of the Negro family in relation to delinquency and crime.

¹ Frazier, E. Franklin, *ibid.*, pp. 374-375.

² Sutherland, E. H., *Principles of Criminology*, p. 170, J. B. Lippincott Company, Philadelphia, 1939.

sented than are single females. Obviously marriage reduces the crime rate of men more than of women. Professor Gillin compared 172 prisoners with their noncriminal brothers. He found the criminals, with greater frequency than their brothers, were single or divorced, given to quarreling with wife, and differed from wife in nationality, religion, educational, and economic status.¹ Failure on parole was reported to be associated with marital discord by the Gluecks.²

MENTAL CHARACTERISTICS OF CRIMINALS

During the second decade of the present century students of criminology were greatly concerned with feeble-mindedness as a cause of crime. Mental tests that had been devised and standardized for school children were applied to adult convicts. The testers not only did not standardize their tests for adults, but they made the same mistake in method that Lombroso had made. They failed to test a control group from the general population. They concluded that mental deficiency was "the greatest single cause of delinquency and crime"³ and that nearly all, if not all, criminals were of low-grade mentality. Significant recent surveys of mental testing of delinquents and convicts have been made by Sutherland,⁴ Zelaney,⁵ and Chassell.⁶ Sutherland concludes that the variations in the methods used by the testers probably reflect more that is significant about attempts to do this kind of testing than they do about the intelligence of criminals; scores of delinquents are not significantly different from those of the general population; compared with the normal part of the population, the feeble-minded do not show a disproportionate amount of delinquency; feeble-minded prisoners cause no more disciplinary problems than others; feeble-minded convicts on parole are about as successful as others; they become recidivists about as frequently as other convicts; and sex offenders are more often feeble-minded than prisoners convicted of other offenses. He concludes that the relationship between crime and feeble-mindedness is, in general, very slight.

¹ Gillin, John L., *Backgrounds of Prisoners in the Wisconsin State Prison and of Their Brothers*, *Amer. Sociol. Rev.*, 1936, 2, 204-212.

² Glueck, Sheldon, and Glueck, Eleanor T., *500 Criminal Careers*, pp. 268-270, Alfred A. Knopf, Inc., New York, 1930.

³ Goddard, H. H., *Human Efficiency and Levels of Intelligence*, p. 74, Princeton University Press, Princeton, New Jersey, 1920.

⁴ For a review of these studies, see Sutherland, *op. cit.*, pp. 103-105.

⁵ Zelaney, L. D., *Feeble-mindedness and Criminal Conduct*, *Amer. J. Sociol.*, 1933, 38, 564-578.

⁶ Chassell, Clara F., *The Relation between Morality and Intellect*, *Teach. Coll., Contr. Educ.*, 1935, No. 607, Part III and Chaps. 3-8.

Zelany equated the procedures of the testers and arrived at a ratio of 1.2 to 1.0 when the appraisals of the intelligence of delinquents and the general population were related. Chassell found correlations of .10 to .39 of morality with intellect, a relationship she thinks is positive, but low. She did, however, report delinquency rates among the feeble-minded unusually high. Carl Murchison gave the Army Alpha tests to a group of White convicts and discovered that the convicts fared slightly better than the soldiers.¹

While the evidence presented here indicates little, if any, statistical relationship between feeble-mindedness and crime, we should not get the impression that it is not an important factor in specific cases of criminal behavior. Where it is associated with such factors as criminal suggestion and the absence of good family, school, and neighborhood influences that establish habits of law obedience, feeble-mindedness may be a very important factor in the explanation of individual cases of criminal behavior. The feeble-minded, per se, are suggestible, not bad.

Every discussion of the traits of criminals mentions psychoses. Every author of such a discussion hastens to call attention to the confusion among the authorities in the definition of the several forms of mental disorganization, the arrays of diagnostic symptoms, and the research methods used in relating mental illness to criminal behavior. The psychoses are regarded as the most severe types of mental disorder but of relatively infrequent occurrence (1 to 5 per cent) among prisoners admitted to penal institutions.² Prison psychosis, which develops after incarceration, is correlated positively with length of sentence,³ indicating the ineffectiveness of present methods of treating criminals. Types of mental disorder most frequently found in criminals are the syphilopsychoses, psychoses in combination with mental deficiency, those related to the use of alcohol and drugs, dementia praecox, manic-depressive psychosis, and psychopathic inferiority.⁴ Mental illness seems to be significant in the etiology of crime in three ways: (1) where delusions of persecution lead the individual to attack his imagined persecutor; (2) where the psychosis has the effect of excluding the patient from relationships that give status, for which he compensates by attention-getting behavior; and (3) where the psycho-

¹ Murchison, Carl, *American White Criminal Intelligence*, *J. Crim. Law Criminol.*, 1924, 15, 239.

² Sutherland, *op. cit.* p. 107.

³ S., Wood, and Waite, *op. cit.* p. 273.

⁴ Parsons, A. P., *Crime and the Criminal*, p. 99, Alfred A. Knopf, Inc., New York, 1926.

sis is a substitute for crime, in an intolerable life situation—a flight from reality as an alternative to criminal outbursts.¹

Neurotics, constitutionally psychopathic inferiors, and epileptics are discovered in varying numbers among criminals. Neurotics, unable to compete satisfactorily in society, *may* resort to crime. The social scientist may regard society, itself, neurotic and the neurotic criminal “merely a person acting naturally in a neurotic society.”² The psychopathic inferior, an unbalanced egocentric, is variously estimated to be responsible for much or little crime. When psychiatrists can get together on their diagnoses, we may have more consistent, if not more substantial evidence on the importance of psychopaths in the etiology of crime. Some psychiatrists consider the fact of conviction of crime evidence of a psychopathic personality. Therefore, all criminals are psychopaths, and, stated in reverse, psychopathic personality becomes an important cause of crime. In a study of psychopaths in the Western State Penitentiary in Pennsylvania, 21 per cent of those so diagnosed were convicted of murder, while among nonpsychopaths, only 12 per cent were murderers.³ The implication here is that psychopathic criminals are involved in a disproportionate number of violent crimes. Wilson and Pescor think not more than a fifth of the prison population is psychopathic.⁴ Whatever the frequency of psychopathic personality among prisoners may be, the fact remains that many more psychopaths exist in the noncriminal population, and the psychopathic criminal must be the product of his psychopathy *and something else*.

At the most only a small proportion of crime can be related to epilepsy. Estimates range from 1 to 6 per cent, in the earlier studies, to .25 per cent in C. L. Anderson's study in Michigan.⁵ He found .21 per cent in the general population. Here again, not all epileptics are criminals. But although epilepsy is found only infrequently among prisoners, it is, in combination with other factors, thought to be contributory to a number of serious crimes.

In summarizing this discussion of the characteristics of criminals

¹ Taft, *op. cit.* p. 83.

² See Devereux, George, Maladjustment and Social Neurosis, *Amer. Sociol. Rev.*, 1939, **5**, 845; Horney, Karen, Culture and Neurosis, *Amer. Sociol. Rev.*, 1936, **2**, 222-224.

³ Wholey, Cornelius C., Psychiatric Report of Study of Psychopathic Inmates of a Penitentiary, *J. Crim. Law Criminol.*, 1937, **28**, 57.

⁴ Wilson, J. G., and Pescor, M. J., *Problems in Prison Psychiatry*, p. 30, Caxton Printers, Ltd., Caldwell, Idaho, 1939.

⁵ Anderson, C. L., Epilepsy in the State of Michigan, *Ment. Hyg.*, N.Y., 1936, **20**, 441-462.

was believed to be possessed of a devil or of the freely-arrived-at will to do wrong. Basing penal policy on this belief, it seemed reasonable to try to change his will to commit crime or failing in this, to eliminate him. But the situation was complicated by other implications of the doctrine of moral responsibility.

Being free to choose good or bad ways of behaving, the criminal was thought to have chosen deliberately to offend. He therefore owed society a debt of restitution in proportion to the injury his crime had done. Where actual material injury was involved, restitution was reasonable; but this was not enough. Having made society suffer, he must suffer in payment of the debt. Pain was the agent (1) to drive out the evil spirit or will to do wrong; (2) to even the score, and (3) to cause other potential criminals to suppress their evil tendencies because of the fear inspired by the frightful example of suffering of those who were punished.

RISE OF THE NEW PENOLOGY

Humanitarians, prominent among whom were the Quakers, armed with the argument that torture, mutilations, and floggings neither reformed nor deterred criminals, began to agitate for a new penology. They succeeded in eliminating most of the worst penal barbarities, substituting solitary confinement in a penitentiary for physical punishment. Their belief was that the offender, when isolated in a cell would review his evil past, become penitent, and be converted. Meanwhile, loss of freedom was a form of payment of his debt to society.

In response to this new theory, penitentiaries were built. Laws were modified to eliminate torture, and crimes were standardized (reduced to a few simple categories) and weighted so that length of the period of incarceration was made commensurate with the supposed degree of severity of the offense. Buildings to house criminals were constructed for security with little thought of the health or comfort of the prisoners. Prison administration frequently was taken over by politicians and the prison personnel were selected for their supposed efficiency (brutality) as guards.

A century of treating offenders in penitentiaries has demonstrated the failure of the method. Few who are committed are reformed. Instead of being converted to morality and good citizenship, the first offenders usually leave the prison embittered, vengeful, and educated in crime by contact with older, more experienced criminals. About half of all admissions to prisons today are of recidivists who have been convicted of one or more previous offenses. Follow-up studies show

that few who are released from prison ever make good adjustments in the community.

One of the first reforms attempted by modern penologists was classification of prisoners. In the eighteenth century prisons, all classes, ages, and sexes of problem people were herded together. One important type of classification was by age.

TREATMENT OF JUVENILE DELINQUENTS

Since children, less than seven years of age, under common law were not capable of committing crime, they could not be classed with older offenders. Regardless of the nature of a child's offense, then, it was not reasonable to house him with habitual criminals. This line of reasoning led to the emergence of the modern distinction between juvenile delinquency and adult crime and eventually to the establishment of special juvenile courts to handle child offenders. In the United States the age limit for juvenile cases varies from sixteen to twenty-one.

The juvenile court in theory is set up as a social agency equipped with trained specialists competent (1) to investigate the total child-in-his-situation (physical, mental, pathological, and emotional traits of the child, and his playmates, school adjustment, home, and neighborhood conditions); (2) to diagnose his case in a conference of all persons qualified to contribute usefully to the analysis; and (3) to plan and administer a program for his adjustment.

The attempt is made to avoid the social stigma of arrest and conviction. The child is not charged with a crime and tried at a public hearing with lawyers for the prosecution and defense debating the issue of his guilt or innocence. The judge does not limit his methods in conformity to traditional juristic procedure. Once convinced that the child needs the service of the court, he proceeds from the incident that brought the case to his attention to study the child and his total environment, together with the history of the case, to determine developmental factors in the child's background. The aim is to understand and to assist the child, not to convict and punish him. Where institutional commitment is employed, it is thought of as treatment, not punishment. This, in brief, is the theory underlying the juvenile court.

In practice, the juvenile court has made a record little better than that of the penitentiary. Although approximately half of its cases are also repeaters, its failures are due in part to failure of the public to understand the requirements and urge the provision of adequate facilities for the treatment of juvenile cases. In many jurisdictions

CHAPTER XII

PSYCHOLOGY IN MUSIC, ART, AND LEISURE¹

Psychology in Music

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Factors Composing Art Ability

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Volitional Perseveration

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Perceptual Facility

Creative Imagination

Aesthetic Judgment

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Miller Drawing Test

Goodenough Draw-a-Man-Test

Typical Studies in the Psychology of Art

Psychology in Leisure

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The Chicago Study

In-school Training for Leisure

Out-of-school Training for Leisure

Leisure for Adults

Typical Studies in the Psychology of Leisure

This chapter could have been called The Psychology of Appreciation and Enjoyment, The Psychology of Culture, The Psychology of Nonvocational Activities, or The Psychology of Activity that Is Performed for Its Own Sake. However, the present title is more descriptive of the actual content of the chapter.

Preliminary to a discussion of any form of aesthetic experience

¹ This chapter was written by Dr. Gunborg Berglund-Gray, Instructor in Psychology at the University of Denver.

should be its definition. In a sense, aesthetics is any pleasing or enjoyable experience. However, the term is usually applied just to those experiences aroused by some modification of nature. Aesthetics is the modification of nature in such a way that certain qualities are accentuated and other qualities are restrained. The sounds of a battle are more pleasing when they are depicted in a symphony than when they actually occur on the battlefield. The painting of a landscape is not a photograph but a reproduction with some qualities emphasized and others subdued. A novel or a drama is not a literal description of a series of events but a selection of certain phases of events, some of which are emphasized and others even omitted.

In all fields of aesthetics there are basic rules or principles that determine whether a production is good or bad. When one recognizes these principles in judging productions, he is said to have good appreciation. One who can point out exactly where a production agrees or disagrees with basic principles of aesthetics is called a critic.¹

PSYCHOLOGY OF MUSIC

While music is as old as civilization itself, it is only in comparatively recent years that it has been the object of scientific investigation. Musicians have traditionally considered music to be an art that is so intangible that it cannot be studied by scientific procedures. However, the trend now is to consider music to be composed of quantitative and measurable sound waves that have both quantitative and qualitative effects on its hearers. Methods have been developed for measuring sound waves and reducing them to scientific simplicity. Progress has been made in analyzing feeling and interpretative reactions to the extent that measurement would seem to be a future probability. In other words, the art of music is slowly becoming the science of music.

PSYCHOLOGICAL PRINCIPLES OF MUSIC

Seashore² has stated 20 basic principles of the psychology of music that are worth careful consideration.

1. The only medium by which music can be conveyed from the musician to the listener is the sound wave.

2. Sound waves have four characteristics that are variable and measurable. They are frequency, intensity, duration, and form. All can be traced to variables in vibration at the point of origin of the sound waves.

¹ See Langfeld, H. S., *The Aesthetic Attitude*, Harcourt, Brace and Company, Inc., New York, 1920.

² Seashore, C. E., *Psychology of Music*, pp. 28-32, McGraw-Hill Book Company, Inc., New York, 1938.

3. The psychological equivalents of these four characteristics of sound are pitch, loudness, time, and timbre. Combinations of these make up harmony, volume, rhythm, and tone quality.

4. There are illusions in hearing as well as in seeing, and the sounds we hear are not always in accordance with the sound waves that have been produced. The nature of the ear is such that certain characteristics of sound waves are selected and others are subdued. The sound heard is often more pleasing than it would have been if all characteristics had functioned equally. For example, the vibrato as heard is considerably reduced in intensity from its existence in sound waves.

5. Musical art is not the production of sounds that are fixed and regular. Rigid pitch, uniform intensity, pure tone, and perfect harmony do not make musical art—that which people enjoy hearing. It is variation from the mechanically perfect that listeners acclaim as pleasing music.

6. There is a basic starting point (zero) in the measurement of each of the four components of sound waves. Intensity begins with silence, form with pure tone, duration with zero duration, and frequency with an arbitrary tone.

7. Understanding the physical and psychological elements of sound makes it possible to define each element accurately. Ambiguous and meaningless terminology can thus be eliminated from the field of music.

8. Pitch, intensity, and time can be represented graphically in a musical pattern score that has both musical and scientific meaning. Since timbre is of more complex nature it is recorded in a series by itself in the form of tonal spectra.

9. It is possible to set up norms of musical performance in terms of objective measurement.

10. Better music can be produced because of scientific research and experimental procedures.

11. All theories of musical aesthetics can be scientifically analyzed and experimentally studied.

12. It is likely to be found that music has therapeutic value in clinical psychology.

13. It is now possible to study the objective measurement of musical talent in relation to the measurement of other aptitudes in the total personality, in solving such problems of musical guidance as "the musical medium, the extent of proposed training, and the object served in the musical pursuit."

14. In giving musical guidance, it is necessary to supplement scientific measurement with adequate audition, case history, consideration of personality traits, and the recognition of human resourcefulness.

15. While all musical performance depends on the mastery of fundamental skills that were isolated and learned as definite techniques, in artistic performance these habits must be so integrated that they are a part of the whole and do not stand out as separate skills or techniques.

16. To promote the acquisition of musical techniques, instrumental aids may be used. For example, frequency, intensity, duration and form can all be quantitatively indicated at the time the tone is made.

17. With the use of scientific measurement in music, the composer and the performer alike will be faced with new problems constantly. "The listener will always be expecting something new."

18. Public school music must be the first to adopt the scientific approach and adjust its methods of teaching accordingly.

19. The psychology of music is not apart from fundamental psychology but a part of it. It is merely an adaptation of the psychological principles of sensation, perception, learning, thinking, feeling, and action, to the production and enjoyment of music.

20. A nonmusical psychologist can record cold musical facts, but only a musician with scientific training can interpret them.

TESTS IN MUSIC

The Seashore Measures of Musical Talent are perhaps the best known music tests. They appeared first in 1919 and were revised in 1939. There are two series, each testing the same talents. Series *A* is designed for use with unselected groups and is more of a general screening test. Series *B* is intended for use where greater diagnosis is desired. The tests measure accuracy in judgment of variations in pitch, loudness, time, rhythm, timbre, and tonal memory. The variations are recorded on phonograph records. In giving the test for pitch discrimination, for example, the examiner says

You will hear two tones in rapid succession. The second tone is either higher or lower in pitch than the first. You are to mark on the test blank in the proper column whether the second tone is higher or lower than the first.¹

Thus, in measuring the sense of pitch, pitch is the only variable. All other components are kept constant. Likewise, in measuring the sense of time, two notes of the same pitch but differing in length, or duration, are sounded. The testee is asked to indicate whether the second note is longer or shorter than the first.

¹ Seashore, C. E., Lewis, D., and Sackett, J. G., *Manual of Instructions and Interpretations for the Seashore Measures of Musical Talent*, Radio Corporation of America, 1939.

It is advisable, if possible, to repeat the test at least once. This gives a more reliable score. In all cases, the score is the total number of correct judgments.

Reliability correlations range from .C9 to .89. When the odd-numbered items were correlated with the even-numbered items (and the Spearman-Brown prophecy formula applied) the results for Series B were as follows:

Pitch.....	.78
Loudness.....	.77
Time.....	.70
Timbre.....	.72
Rhythm.....	.72
Tonal Memory.....	.89

The validity of these tests is indicated in a study by Stanton¹ at the Eastman School of Music. Entering students were given the Seashore music tests and an intelligence test. On the basis of both tests they were rated in five classifications—*safe*, or likely to succeed in music school; *probable*, or those who will likely make satisfactory musical progress if conditions are favorable; *possible*, or those who might succeed in music but the odds are against them; *doubtful*, or those who will not “carry the work of the course with sufficient credit or satisfaction to warrant the effort involved”; and *discouraged*, or those who “are obviously not fitted to carry on the regular course work in a music school.” Of 565 students who graduated within four years, “the percentages graduating from the groups classified as discouraged, doubtful, possible, probable, and safe were 17, 23, 33, 42, and 60 respectively.” Obviously, the tests were predictive.

However, as the authors warn in the manual of instructions, these tests are not foolproof. “As measuring instruments they are fully adequate, but the use of them requires tact, skill, ability to motivate, favorable atmosphere, and wisdom in interpretation.”

The Kwalwasser-Dykema Musical Tests, like the Seashore tests, use phonograph records and measure various forms of music discrimination. There are 10 parts or tests in the battery: Tonal Memory, Quality Discrimination, Intensity Discrimination, Tonal Movement, Time Discrimination, Rhythm Discrimination, Pitch Discrimination, Melodic Taste, Pitch Imagery, and Rhythm Imagery.²

In the quality discrimination test two tones are sounded twice,

¹ Stanton, H. M., *The Measurement of Musical Talent*, *Univ. Ia. Stud. Psychol. Music*, II, 1935.

² These tests are published by Carl Fischer, Inc., New York.

sometimes on the same instrument and sometimes on different instruments. If two instruments are used, the quality between the two soundings is sufficiently different to reveal the fact to one who has keen quality discrimination.

The tonal movement test "measures the ability to judge the tendency of a succession of tones to proceed to a point of rest." There are 30 patterns of four tones each, all incomplete without a fifth tone. The testee must decide whether the fifth tone should be higher or lower than the fourth tone to complete the melodic progression.

In the melodic taste test the opening phrases of two short melodies are identical but the closing phrases are different. The testee chooses which of the closing phrases makes the best melody.

Neither the reliability nor the validity of these tests is mentioned in the manual. However, Manzer and Marowitz¹ gave the battery to 101 college sophomores and juniors and then repeated it a few days later. They computed the coefficients for each of the subtests between the two testings and found the following reliability correlations: tonal memory, .73; quality discrimination, .32; intensity discrimination, .05; time discrimination, .43; and rhythm discrimination, .48. Except for tonal memory, these are all too low for effective measurement.

Weiner² gave the Kwalwasser-Dykema tests to 100 students in the High School of Music and Art in New York City. One year later he repeated them and computed the correlations. For tonal memory the coefficient of correlation was .56, for quality discrimination it was .40, for intensity discrimination .21, for rhythm discrimination .08, and for time discrimination .50.

The low validity of the test is indicated in a study by Bienstock,³ who correlated the scores on five of the Kwalwasser-Dykema tests (tonal memory, quality discrimination, intensity discrimination, time discrimination, and rhythm discrimination) with the classroom marks made in music by 80 students in a music school. The correlations ranged from $-.15$ to $.43$ with an average of $.14$.

Drake Tests of Musical Talent⁴ are in four parts—test of musical memory, test of interval discrimination, test of retentivity, and test

¹ Manzer, G. W., and Marowitz, S., The Performance of a Group of College Students on the Kwalwasser-Dykema Tests, *J. Appl. Psychol.*, 1935, **29**, 331-346.

² Weiner, M., The Effects of Home Practice on Music Ability as Measured by Five of the Kwalwasser-Dykema Tests, Master's Thesis, No. 374, School of Education, College of the City of New York.

³ Bienstock, S. F., A Predictive Study of Musical Achievement, *J. Genet. Psychol.*, 1942, **41**, 135-145.

⁴ Drake, R. M., Four New Tests of Musical Talent, *J. Appl. Psychol.*, 1933, **17**, 136-147.

of intuition. The first two are best known and have highest reliability and validity.

The musical memory test consists of 24 two-measure melodies each of which is repeated with four possible variations—same with no change, change in key, change in time, and change in note or notes. The testee records on an answer sheet whether the repetition is the same (S), or different in key (K), or different in time (T), or different in note (N). The standard or base melodies increase in difficulty and the variations of each increase in number up to seven. The author claims a reliability coefficient (by test repetition) of .93 and a validity coefficient (with teachers' estimates) of .67.

The interval discrimination test requires that the testee choose the longer of each of 80 pairs of intervals. The first interval is always between tones that are below middle C and the second is between tones higher in pitch. In the first half of the test, the intervals become progressively shorter, and in the last half they become longer. For example, in Trial one the first interval is eleven half-steps and the second is four half-steps; in Trial forty the first interval is sixteen half-steps and the second is fifteen half-steps. A reliability coefficient of .83 (split half method) is claimed for the test and a validity coefficient of .35 (with teacher estimates).

The retentivity test is intended to measure the more elemental factors of melody. It developed primarily as a test of absolute pitch, or memory for isolated tones. It is really a memory test for interval, rate (given by a metronome), and three tones. The reliability is .76 for the entire test and .61 for the tone part alone (absolute pitch). When compared with teachers' estimates, the correlation is .47 for music students.

The intuition test is supposed to measure "expression and feeling for musical form," which is assumed to be innate and unaffected by musical training. It is a measure of the ability to distinguish between a proper and an improper answer to an unfinished musical theme. In the test, two musical phrases are given (or played); the testee decides whether or not the second is a proper complement of the first. There are 72 such pairs of phrases. Both the coefficient of reliability and the coefficient of validity are low (below .40).

The Drake tests are not presented on the phonograph but on the piano. Obviously, the test administrator must be skilled in playing various parts of the test and even then he introduces a possible additional variable.

Drake¹ made a careful study of the reliability and validity of a

¹ Drake, R. M., *The Validity and Reliability of Tests of Musical Talent*, *J. Appl. Psychol.*, 1933, 17, 447-458.

number of music tests using several groups of English school children as subjects. The validity and reliability correlations for the three batteries discussed above are given in Table 119. As Drake concludes, only three tests of the three batteries have sufficiently high reliability and validity coefficients to make them useful instruments of measurement. These have been starred in Table 119.

TABLE 119.—COEFFICIENTS OF VALIDITY AND RELIABILITY FOR THREE MUSIC TESTS

Tests	Validity			Reliability		
Drake tests:						
*Musical memory.....	.671,	.546,	.660	.93,	.91,	.85
Interval discrimination. . . . .	.585,	.421,	.770	.74,	.83,	.43
Retentivity.....	.546,	.387,	.520	.76,	.73,	.53
Intuition.....	.361,	.355				
Seashore tests:						
*Pitch.....	.270,	.315,	.534	.72,	.84	
Intensity.....	.051,	.143,	.157	.85,	.88	
*Tonal memory.....	.334,	.418,	.114	.94,	.86	
Time.....	.149,	.383,	.414	.68,	.70	
Rhythm.....	.084,	.367		.68,	.48	
Consonance.....	— .030,			.30		
Kwalwasser-Dykema tests:						
Quality.....	.171,	.241		.66,	.39	
Melodic taste.....	— .132,	— .108,	— .089	.61,	.40	
Pitch	— .239,	— .003		.39		
Tonal memory.....	.417	.255		.55,	.57	
Tonal movement.....	.155	.238,	— .027	.85,	.73	

* Starred tests have satisfactory reliability and validity.

Musical achievement tests, which measure the effectiveness of musical training, are several in number.

The *Knuth Achievement Tests in Music* are on three levels—for grades three and four, for grades five and six, and for grades seven to twelve. They are all multiple choice in form. The test administrator plays a few measures on the piano from one of four musical scores on the test. The student then checks the melody played. There are 40 such exercises at each test level and the score is the total number right.

The *McCauley Examination in Public School Music* is for grades four to nine. It measures sight and oral identification of melodies; information about musical compositions, instruments, terminology, and famous musicians; and ability to identify notes, rest values, keys, and chromatics. The test is timed and takes 100 minutes to administer.

The *Gildersleeve-Soper Musical Achievement Test* is for grades four to eight and measures knowledge of musical terms, musical notations, musical symbols, familiar melodies, types of compositions, and composers. Centile norms are based on 3,000 cases.

The *Providence Inventory Test in Music* is in 10 parts—Naming Notes, Placing “Do,” Naming Note Values, Naming Key Signatures, Naming Measure Signatures, Naming Rest Values, Naming Syllables, Naming Melodies, Naming Syllables (Bass Staff), and Naming Symbols. The total test takes but 28 minutes. The content and method of scoring are both objective.

TYPICAL STUDIES IN THE PSYCHOLOGY OF MUSIC

Scientific research must always follow in the wake of scientific measurement. As more accurate tests are developed, more accurate and significant research will be performed. The following studies are the results of the development of the musical tests reviewed above.

Ross¹ studied the relation of musical talent to general intelligence and scholastic achievement on both the elementary and high-school levels. He gave 1,541 pupils in grades five to twelve the Seashore Tests of Musical Talent, the Terman Group Test of Mental Ability, and the Stanford Achievement Tests.

There were low but positive relationships between musical talent and intelligence. The correlations between intelligence and the musical tests were as follows: pitch, .25; intensity, .12; time, .17; consonance, .21; tonal memory, .26; and rhythm, .16. The correlations indicated no relation between musical talent and reading and arithmetic abilities. The composite achievement scores correlated with the sense of pitch .20, with intensity .25, with consonance .26, and with tonal memory .31.

It was found that those pupils from the eleventh and twelfth grades who elected music had a mean I.Q. of 110, which was three points above the average for the entire group in these two grades.

In the elementary grades, the upper 10 per cent on the Seashore tests were found to equal or excel 79 per cent of their classmates in reading, 77 per cent of them in arithmetic, and 80 per cent on the whole achievement test battery. The lowest 25 per cent on the musical tests were found to be low on both the intelligence test and the achievement tests.

Drake² administered a battery of music tests selected from his own,

¹ Ross, V. R., Relationship between Intelligence, Scholastic Achievement, and Musical Talent, *J. Juv. Res.*, 1936, 20, 47-64.

² Drake, R. M., The Relation of Musical Talent to Intelligence and Success in School, *J. Musicol.*, 1940, 2, 38-44.

the Kwalwasser-Dykema, and the Seashore batteries to a group of 163 thirteen-year-old English boys. He then correlated the resulting scores with intelligence. The r 's ranged from .03 to .27. In another experiment he administered his own test of musical talent and the Otis Higher Examination to a group of 158 American college women. The correlation was .28. The music test scores correlated .16 with college grades.

Hollingworth¹ studied the amount of musical talent among intellectually superior children. She found that children who are in the upper centile on intelligence tests are no better than a random sampling of children of the same chronological age on the Seashore music tests. The superior children had mean centile scores on the music tests as follows: pitch 46.7, intensity 50.0, time 58.0, consonance 47.9, and tonal memory 52.3. (Norms appropriate for their chronological age, eight to eleven, were used.)

Sward² studied the percentage of Jewish people in symphony orchestras in the United States. In twelve of the best known symphony orchestras he found that 34 per cent of the string section and 51 per cent of the first-violin players were Jewish. In eleven of the twelve cities where these orchestras were located, Jews made up only 16 per cent of the population. Of the solo artists who appeared with the Boston, Chicago, New York, and Philadelphia orchestras for twelve seasons (1920 to 1933), 47.5 per cent of the violinists and 35.4 per cent of the pianists were Jewish. See Table 120 for these data.

TABLE 120.—JEWISH MUSICIANS IN SYMPHONY ORCHESTRAS

	Number	Jewish	Per cent
Symphony players:			
String section.....	664	226	34 0
Wind section.....	167	16	9 6
Brass section.....	151	16	9 4
Percussion section.....	46	11	23 9
Total.....	1,048	269	25 7
Solo artists:			
Violinists.....	59	28	47 5
Pianists.....	65	23	35 4
Violincellists.....	21	3	14 3
Total.....	145	54	37 2
Jews in:			
General population.....	.....	...	3 58
Eleven symphony cities.....	..	.	16.1

¹ Hollingworth, L. S., *Music Sensitivity of Children Who Test above 135 I.Q.*, *J. Educ. Psychol.*, 1926, **17**, 95-107.

² Sward, K., *Jewish Musicality in America*, *J. Appl. Psychol.*, 1933, **17**, 675-712.

Gundlach¹ made an interesting study of the relation of musical structure to its effect on hearers. He played 40 selected fragments (recorded) from classical piano solos and orchestral compositions to 102 auditors (54 were advanced music students). The listeners reported what mood they believed the composer was trying to express in each fragment. He then analyzed the music on the basis of seven structural characteristics—loudness, tempo, average pitch, rhythm, melodic range, orchestral range, and variety of step widths between successive notes.

TABLE 121.—MOODS MOST FREQUENTLY ASSOCIATED WITH CERTAIN STRUCTURAL CHARACTERISTICS OF MUSIC

Structural Characteristics	Moods
Tempo:	
Fast.	Animated, glad, uneasy
Slow	Dignified, tranquil, somber, delicate, melancholy, mournful
Rhythm:	
Smooth.	Brilliant, animated, glad
Rough, irregular.	Uneasy, grotesque
Intensity:	
Loud	Triumphant, animated, brilliant
Soft	Delicate, tranquil, sentimental, melancholy
Pitch:	
High	Brilliant, sentimental, whimsical
Low	Mournful, somber, dignified
Melodic range:	
Wide	Brilliant
Narrow	Mournful, somber
Orchestral range:	
Wide	Uneasy, animated
Narrow.	Tranquil, delicate, dignified
Melodic steps:	
Large	Triumphant, exalted, glad
Small	Uneasy, mournful

The results indicated (see Table 121) that musical structure tends to produce certain characteristic moods or feelings with fair uniformity, regardless of the musical training of the listeners. Thus, Handel's *Harmonious Blacksmith* produced a mood of dignity while the scherzo from Dvorak's *New World Symphony* produced an animated mood. The former is predominately slow in tempo while the latter is fast.

Wyatt and Langdon² studied the effects of phonograph music in

¹ Gundlach, R. H., Factors Determining the Characterization of Phrases, *Amer. J. Psychol.*, 1935, 47, 624-643.

² Wyatt, S., and Langdon, J. N., Fatigue and Boredom in Repetitive Type Work, *Industr. Health Res. Bd.*, London, 1938, No. 77.

industry on the production of paper snappers, a short cycle job that takes only 30 seconds. Production was carefully noted for 30 days without music, then for 40 days with phonograph music distributed throughout the day in various ways, and again for 25 days without music. Music definitely increased production from 2.6 per cent to 6.0 per cent, depending on the time of day it was played.

The effects of amplified phonograph music on scrappage in the manufacture of radio tubes was studied by Humes.¹ He found that in a 3-week period of no music there was a mean hourly scrappage of 3.97 per cent. When slow music (63 to 80 beats per minute) was introduced for an hour and 15 minutes per day there was a mean hourly scrappage of only 2.84 per cent. When fast music (104 to 152 beats per minute) was played for the same period there was a mean scrappage of 2.88 per cent per hour. Then when programs of familiar, new, and subtle music were arranged and played for an hour and 15 minutes each day, the mean hourly scrappage was 3.46 per cent. The differences in scrappage between the three music periods and the no-music period were all statistically significant. (Critical ratios were 7.24, 8.46, and 3.21 respectively.)

The effects of jazz and dirge music on typewriting was studied by Jensen.² He checked the words and errors per minute made by a group of eleventh and twelfth-grade pupils during periods of no music, jazz music, and dirge music. He found that the average speed was 33.64, 31.06, and 32.93 words per minute for the three periods. The errors were .937, 1.21, and .907 per minute. Jazz music decreased speed and increased errors, while dirge music decreased speed and also errors.

These and other studies seem to justify the conclusion that when musical cadence is just slightly faster than the tempo of the activity being performed, the activity is increased. If the music is of varied tempo or just slightly slower than the activity, it then tends to reduce the speed of the activity.

PSYCHOLOGY IN ART

The average person does not realize that art functions in every phase of daily existence. Too often, art is regarded as that which is displayed in the galleries of museums and on the walls of some public buildings. Actually, art is found in every phase of modern life.

¹ Humes, J., Effects of Occupational Music on Scrappage in the Manufacture of Radio Tubes, *J. Appl. Psychol.*, 1941, **25**, 573-587.

² Jensen, M. B., The Influence of Jazz and Dirge Music on the Speed and Accuracy of Typing, *J. Educ. Psychol.*, 1931, **32**, 458-462.

(1) It is displayed in paintings and reproductions traditionally designated as "art." (2) It is an essential part of all display advertising, whether pictorial or in show windows. (3) It is obvious in the design of all manufactured articles, from flat iron to public buildings. (4) It is a part of the design and color of all clothing, from footwear to milady's headdress. (5) It is the acme of all human behavior, because by definition *art is the product of superior skill*.

The mediums of artistic expression are many—sculpture, painting, drawing, design, in fact, whatever may be one's field of specialty. *Excellence in behavior is art* regardless of the nature or the product of the behavior.

FACTORS COMPOSING ART ABILITY

Artistic ability, like any other ability, is composed of an inherited capacity, or faculty, and learning, or development. The latter is, of course, limited by the former, yet superior artistic capacity is useless without development. Artistic ability is both inherited and acquired.

Meier explains that there are at least six significant factors in artistic ability.¹ Three of these are believed to run in families or are "probably involved in stock heredity," but the others are probably more dependent on environmental development. While these overlap with each other, they do indicate the complexity of artistic ability.

Craftsmanship aptitude is evidenced in early life in traits of patience, pride in doing things well, good eye-hand coordination, and a tendency to acquire skills easily. Persons with such traits are likely to have ancestors with craftsmanship ability, such as cabinet making, weaving, wood carving, watch and instrument making, engraving, drafting, etc. Evidence for this statement is shown in Table 122. Note that the average number of craftsmen in the ancestry of artists and art students is more than twice that of unselected high-school and college students.

Volitional perseverance is the "self-initiated desire to carry on sustained planning and assiduous effort leading to the accomplishment of a product satisfying to the craftsman ideal of work." In other words, there is motivation to turn out a product of superior nature. Whether in child or adult, there is a dissatisfaction with accomplishment that does not meet a high standard of excellence. The person with artistic talent is not satisfied with sloppy work. He is a severe critic of his own accomplishments. He perseveres until his high

¹ Meier, N. C., Factors in Artistic Aptitude, *Psychol. Monogr.*, 1939, 51, 140-158; and *Examiners' Handbook: Meier Art Tests*, University of Iowa, Iowa City, 1942.

standard of work is reached. He does not have to be forced to turn out better work. He desires excellence.

Aesthetic intelligence is the ease with which the person with art capacity can "assimilate experience which has potential significance for present or future development in a work of art." It is the ability to

TABLE 122.—CRAFTSMEN IN THE ANCESTRY OF STUDENTS AND ARTISTS

Group	N	Per cent with no known craftsmen in ancestry	Average number of craftsmen per person in ancestry
Unselected college students.....	153	36	2 05
Unselected high-school students..	23	35	1 61
Total.....	176	35.8	2 00
Artists.....	58	15	3 59
Art students, art schools.....	282	9	4 74
Art students, colleges.....	230	13	3 98
Art students, high school and normal school.....	43	13	4 07
Art staff, engraving firm.....	31	6	5 64
Total.....	644	11.02	4 37

organize vivid experiences and understand their significance. It consists of segments of general intelligence that are significant in art. The superior artist is usually superior in general intelligence.

Perceptual facility is the "ease and readiness with which the individual responds to and retains experience, particularly that of a visually experienced type." It is the ability to see more and retain it longer. A trip through the country is an exciting adventure for an artist. The ordinary person looks at a tree and sees merely an object that produces shade. The artist looks at the same tree and sees a poem, or a painting, or an object of beauty. The artist does not have to hunt for perceptual meanings; he is always seeing them. For him, life is full of interest. He has habits that "feature adequacy and completeness in examining everything of interest." Details do not escape his notice.

Creative imagination is the ability to select certain significant parts of past experiences and recombine them into a "composition having an esthetic character." A work of art, regardless of the medium, is always an expression of the experiences of the artist—not as they occurred but as they have been recombined and synthesized to portray something of the artist himself. The new is always composed of parts of the old. It is not a duplication of the old but the old in new relationships.

Unless the old is shown in new clothing, there is no art. An untouched photograph is not art. Creative imagination is to select some things for emphasis and other things for omission. The artist is creative when he puts an object in a new setting.

Aesthetic judgment is the ability to discern those relationships that are in accordance with universal principles of all good art. It is the perception of the functioning of aesthetic principles. Whether a drawing be produced by a prehistoric caveman or by a modern artist, if it shows proportion and balance it will meet the approval of all those who have aesthetic judgment. It is "not the application of a series of rules but is something which the individual acquires on the basis possibly of some innate neuro-physical constitution."

These six factors are not equally significant in the production of all art but certainly they are all important. They constitute a basis for further scientific study of artistic behavior.

ART TESTS

The Meier Art Judgment Test¹ is perhaps the best known test in the field of art. It consists of 100 pairs of pictures, one of each pair differing from the other in some significant detail. The testee chooses which of each pair he prefers. The better picture of each pair was determined by the opinion of 25 art experts. The score is the number of accurate choices plus added weight for certain pairs that have been found to be especially discriminating. Percentile norms are given for adults, senior high-school and junior high-school levels.

The reliability of this test is in the high seventies (range .70 to .84), which is regarded as satisfactory. However, the author promises to publish two supplementary tests (on *Creative Imagination* and *Aesthetic Perception*) which, when combined with the *Art Judgment* test, will measure artistic talent with much greater accuracy. The validity of the test is indicated by the fact that those with known art ability score significantly higher than average individuals. Art-school teachers score higher than art-school students, and they score higher than senior high-school students. Furthermore, art-judgment scores correlate very low with general intelligence (range—.14 to .28), at least indicating that this test is not measuring general intelligence. One research reports a correlation of .46 between test scores and subsequent grades in art classes for 50 students.

The McAdory Art Test² is another prominent test of the same nature. This consists of 72 plates, each illustrating some subject in

¹ This test was originally known as the Meier-Seashore *Art Judgment Test*.

² Published by Teachers College, Columbia University, New York, 1929.

four different ways. The testee ranks all four variations in order of his preference. The subjects are from a wide variety of objects in everyday life, such as furniture, utensils, clothing, architecture, painting, etc. Some are in black and white, and some are in color. The correct ranking, or the key, has been determined by the consensus of rankings of a large number of experts. Norms are available for each grade from three through twelve and for adults.

Reliability coefficients range from .59 to .93, which is high enough for use by trained testers. The correlation with intelligence is low, as are the correlations with scores made on the Meier test. The correlations between scores on this test and subsequent art-school grades are also low. In general it is regarded as inferior to the Meier test.

The Lewerenz Visual Art Tests¹ are designed to measure art abilities in the public schools. There are norms for grades three to twelve inclusive. The test has nine subtests that are arranged as follows:

Part I:

- Test 1. Recognition of Proportion
- Test 2. Originality of Line Drawing

Part II:

- Test 3. Observation of Line and Shade
- Test 4. Knowledge of Subject Matter Vocabulary
- Test 5. Visual Memory of Proportion

Part III:

- Test 6. Analysis of Problems in Cylindrical Perspective
- Test 7. Analysis of Problems in Parallel Perspective
- Test 8. Analysis of Problems in Angular Perspective
- Test 9. Recognition of Color

A reliability correlation of .87 is reported for 100 pupils in grades three to nine. The validity of the test is indicated by a correlation of .40 between scores on the test and marks in art classes for a group of Los Angeles school children.

There are many other tests of artistic ability, but the three just mentioned are typical. The Knauber *Art Ability Test* measures the effects of art training and has norms for grades seven to sixteen. The same author also has an *Art Vocabulary Test*, which has been found useful in school situations. There are a number of art information tests, especially in such over-all survey tests as the *Cooperative General Culture Test* and the *Graduate Record Examination*. There are also a number of drawing scales that can be used to rate drawings by children. McCarty and Thorndike have constructed such scales.

¹ Lewerenz, A. S., *Tests in Fundamental Abilities of Visual Arts*, California Test Bureau, Los Angeles, 1927.

INTELLIGENCE AND DRAWINGS

A number of attempts have been made to infer the level of intelligence from the quality of drawings. Binet included two drawings in his famous intelligence scale (a square in the fourth year and a diamond in the seventh). Two intelligence tests have been devised and stand-

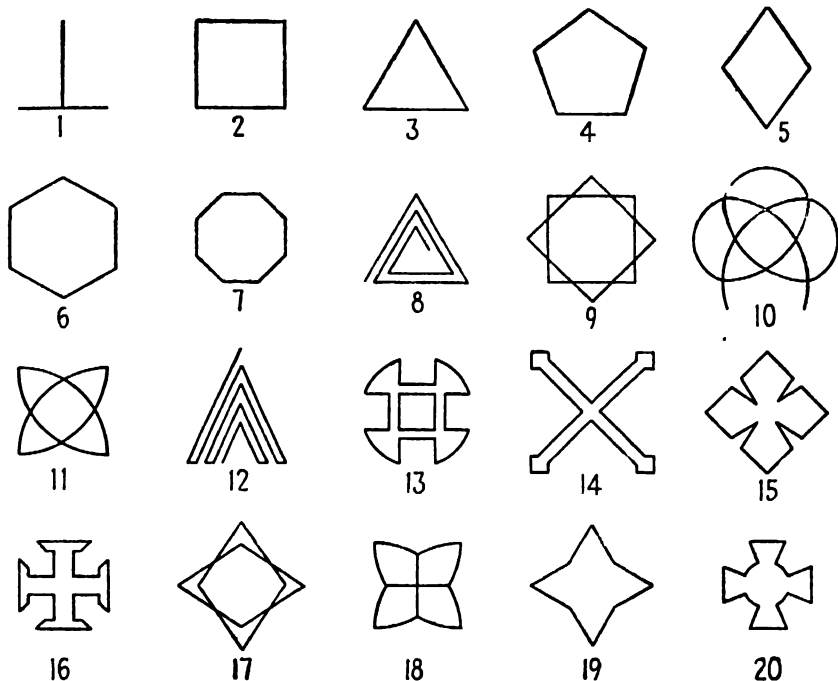


FIG. 47.—Drawings in the Miller intelligence test.

ardized that consist entirely of drawings. Both are unique and worth brief review.

Miller Drawing Test.—Miller¹ took his cue directly from the Binet test and devised a scale of 20 drawings of increasing difficulty (see Fig. 47). The testee is asked to copy the figures as they are shown to him, one at a time, on white cardboards 11 in. by 15 in. There is no time limit and the size of the copy is disregarded. Norms were obtained for grades four to twelve inclusive.

A reliability correlation of .87 was found when the test was readministered to 300 children. It correlated with scores on the Pintner-Cunningham Primary Mental Test .75 with children in the

¹ Miller, J., *Intelligence Testing by Drawings*, *J. Educ. Psychol.*, 1938, **29**, 390-394.

kindergarten and first grade. The Otis Primary Test was used in grades two to five, and the correlation was .72 for 400 children. The Henmon-Nelson Test of Mental Ability was used in the upper grades, and the correlation was .69. All the children tested were in Wilkes-barre, Pennsylvania. When the test results were compared with teachers' judgments of pupils' intelligence, a correlation of .85 was

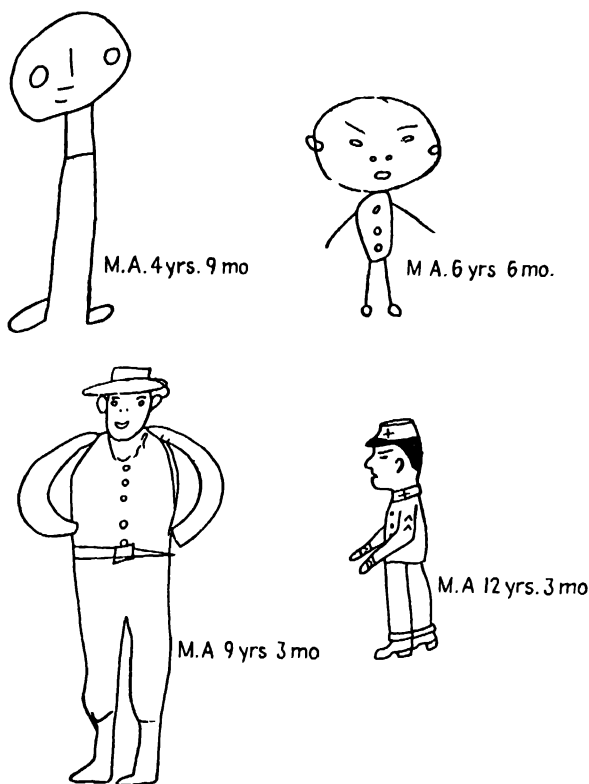


FIG. 48. Drawings and their mental-age equivalents.

found for the kindergarten and first grade, .75 for the second grade, and .73 for the third grade.

This test is easily administered and quickly scored. The correlations with other tests seem too high in light of the reliability correlation of .87, but further research is now in progress.

Goodenough Draw-a-Man Test.—A more prominent test of intelligence by drawings is by Goodenough.¹ She believes that “the

¹ Goodenough, F. L., *Measurements of Intelligence by Drawings*, World Book Company, Yonkers-on-Hudson, New York, 1926.

changes in children's drawings that take place from age to age as well as the difference between the drawings of children of the same age have been shown to be far more closely related to general intelligence than to special artistic talent in children under the age of ten or eleven years."¹ Consequently, she has developed a test in which children are instructed to "make a picture of a man. Make the very best picture you can. Take your time and work very carefully." Then the drawings are scored according to very objective instructions, and the mental age determined from a table for ages four to twelve inclusive.

Typical drawings and the mental ages they indicate after being scored are shown in Fig. 48. (These are from the files of the University of Pittsburgh Psychological Clinic.)

The reliability was originally reported by Goodenough to be .94 on retest and .77 by the split-half method. However, Williams² has since found that the scoring is not entirely objective and there is a discrepancy when different scorers rate the same drawing. He found that correlations between separate ratings ranged from .80 to .96. McCarthy³ found that scorers do not agree with themselves when they rerate a drawing. Such discrepancies amounting to a year or more in mental age were found in 12.4 per cent of the cases. She found a split-half reliability of .89, but only .68 on retest.

Like the Miller test, the validity of the Goodenough test is surprisingly high. As originally reported by Goodenough, the correlations with the Stanford-Binet Test were as follows: fourth grade, .86; fifth grade, .70; sixth grade, .83; seventh grade, .72; eighth grade, .56; ninth grade, .73; tenth grade, .85; average for all grades, .76. On the whole, these correlations are substantiated by later studies.

It must be emphasized that drawing tests, such as the two just discussed, are not indicative of artistic ability. Superior drawings indicate superior intelligence but not superior art ability. Goodenough even doubts that children under twelve, except in rare instances, ever possess special artistic talent. She says, "In spite of careful search, both in connection with this study and during a year spent as field worker in the Stanford University gifted-children survey, the writer has been unable to locate a single child under the age of twelve years whose drawings appeared to possess artistic merit of a degree

¹ Goodenough, F. L., *Developmental Psychology*, p. 333, D. Appleton-Century Company, Inc., New York, 1934.

² Williams, J. H., *Validity and Reliability of the Goodenough Intelligence Test*, *Sch. & Soc.*, 1935, **41**, 653-656

³ McCarthy, Dorothea, *A Study of Reliability of the Goodenough Drawing Test of Intelligence*, *J. Psychol.*, 1944, **18**, 201-215.

at all comparable to the musical genius occasionally shown by children of this age."¹

TYPICAL STUDIES IN THE PSYCHOLOGY OF ART

There have been a large number of significant investigations in the field of art that cannot be reviewed in this chapter. Some of them are pure research and deal with such problems as color vision, conditioning, and design perception. Others are in the applied field and have already affected the nature of advertising and design.²

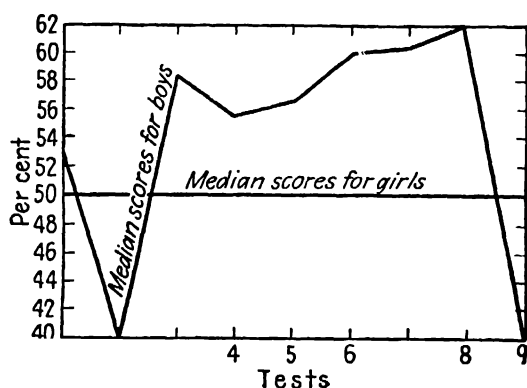


FIG. 49.—Comparison of median scores for boys with median scores for girls on the Lewerenz tests in visual art.

Using his visual art tests, mentioned above, Lewerenz³ studied *sex differences* among school children in Los Angeles. He found that the girls were superior in only two of the nine abilities measured—originality of line drawing, and recognition of color (see Fig. 49).

Brandt⁴ has devised a camera that records eye movements and fixations while the subject is looking at a picture. By the use of this apparatus such problems are studied as the following: areas of primary attention, effect of color on identical layouts, effects of mass on the attention value of various units, types of pictures that attract greatest interest, etc. It is probable that research with this device will make the commercial use of art so objective that in the future it will be used only in the manner that is most effective.

¹ Goodenough, F. L., *Measurements of Intelligence by Drawings*, p. 53, World Book Company, Yonkers-on-Hudson, New York, 1926.

² Studies of the significance of color in advertising are reviewed in Chap. XVI.

³ Lewerenz, A. S., *Sex Differences on Ability Tests in Art*, *J. Educ. Psychol.*, 1918, 19, 629-635.

⁴ Brandt, H. F., of Drake University and *Look* magazine. See also Taylor, E. A., *Controlled Reading*, University of Chicago Press, Chicago, 1937.

Michaels¹ studied color preferences among school children at various ages. Except for age six, there was high agreement for blue and red as favorite colors and for green and yellow as the colors least favored. Violet and orange were the intermediate colors, and the agreement was less reliable (see Table 123).

TABLE 123.—SIX COLORS RANKED ACCORDING TO PREFERENCE AT VARIOUS AGE LEVELS

Age	N	Colors					
		Violet	Green	Blue	Yellow	Orange	Red
6.0 years	27	4	3	5	1	6	2
7.2 years	52	5	3	1	6	4	2
8.1 years	62	4	6	1	3	5	2
9.2 years	58	3	6	1	5	4	2
10.3 years	88	4	6	1	5	3	2
11.2 years	64	2	6	1	5	3	4
12.4 years	84	2	6	1	5	3	4
13.4 years	65	3	5	1	6	4	2
14.3 years	57	5	6	1	4	3	2
15.4 years	18	5	2	1	4	6	3

Katz² studied the preferences of school children for traditional and modern paintings. He constructed a test of 64 pairs of paintings, one of which was an accepted painting (chosen from Italian, Dutch, Flemish, French, German, and American art), and the other a modern painting (chosen from the schools of impressionism, expressionism, and cubism). The traditional pictures had all been recommended for study in the New York City elementary schools, while none of the modern pictures had been so recommended. The test was given to 2,437 boys and girls in grades two to six. Each pupil chose the picture in each pair that he liked better. At all grade levels, there was a preference for traditional paintings, although this preference decreased in the upper grades and became of less statistical significance. The mean score for traditional pictures was 39.82 and for the modern pictures it was 24.18.

PSYCHOLOGY IN LEISURE

Progress is in the direction of increasing the amount of leisure time for everyone. When the work day was long and work was strenuous,

¹ Michaels, G. A., Color Preference According to Age, *Amer. J. Psychol.*, 1924, 35, 79-89.

² Katz, E., Children's Preferences for Traditional and Modern Paintings, Thesis, Teachers College, Columbia University, New York, 1944.

there were no leisure time problems. People worked and ate and rested. However, more extensive use of machinery, improved methods of working, and increased influence of labor unions have reduced the length of the working day (and week) until it is now approximately half the awake hours. Today everyone has leisure time, as well as energy to do something, other than rest, during that time. As a result, parasitical elements in our society have exploited the need for leisure time activities and entertainment and sold at great profit¹ certain recreations that are of doubtful value and in some cases definitely detrimental. We have a few seriously planned recreational programs on a community-wide basis, and we do not educate our people to spend their leisure time beneficially on an individual basis. One of the most serious deficiencies of our "American way of life" is the lack of preparation for the beneficial use of leisure time.

Leisure activity, or recreation, may be defined as any nonvocational behavior that is performed for its own sake. There is intrinsic pleasure in the activity itself. However, if it is a means of livelihood, it is then a vocation or profession and not a leisure activity, even though it is enjoyed.

EDUCATION FOR LEISURE

The leisure time of the average school child has increased in recent years. He no longer must spend his before-and-after school hours in adding to the family income. On the basis of figures issued by the United States Office of Education, the average school child spends 9.85 per cent of his time in school; he sleeps 37.5 per cent of his time (9 hours per night); and he spends 8.33 per cent of his time eating his meals. This leaves 44.32 per cent of his time, or an average of approximately 10 hours per day, for leisure. (Of course, this varies with different parts of the country and in different seasons of the year.)

Educators have long recognized the obligation of the school in preparing the child for leisure as well as for vocational living. The following quotations typify the opinions of educators in general.

JOHN W. STUDEBAKER: It would seem that if we can be sure of anything in these days we can believe that all the processes of modern civilization point very directly toward an increasing amount of leisure for which people must be adequately prepared if this important time is to be used in wholesome and constructive ways.

WILLIS A. SUTTON: I do not think there is any phase of our whole education work that is more important than the obligations which are being placed upon education by the new leisure that is coming into modern life.

¹ One hundred million people attend 20,500 moving pictures weekly in the United States, paying \$25,000,000 for the privilege.

MILTON C. POTTER: Man alive! This leisure time situation is slapping us school men in the face, demanding our attention.

C. B. GLENN: The way in which leisure time is spent is of the highest importance in character development, due to the fact that it is during one's leisure moments rather than during the hours of work that character is made or marred.

JOHN H. FINLEY: It will be a far more difficult task of civilization to teach men to use leisure rightly than to instruct them how to labor efficiently.

However, "to do is not so easy as to know what is good to be done." Educators recognize the importance of the problem, but they have made little progress toward effectively solving it. More research is needed in evaluating the efforts and programs now in progress. It is not enough to adopt a leisure program. That program must be effective.

The Chicago Study.—A large number of city and community surveys have been made of the needs, potential opportunities, and effectiveness of present programs in recreation for both young people and adults. One of the most extensive and thorough of these was of five selected Chicago communities for the Chicago Recreation Commission.¹ The specific problem was to discover the answer to three questions.

1. How great is the appeal of recreational activities to boys and girls, both delinquent and nondelinquent?

2. Does supervised recreation help in the treatment and prevention of juvenile delinquency and if so, how much?

3. What should be done to provide more wholesome recreation and to reduce juvenile delinquency?

Daily observations were made for one year (1938-1939) of the leisure activities of 23,156 boys and girls in five Chicago communities, four with high delinquency rates and one (for control), a relatively nondelinquent area. Only children between the ages of ten and seventeen were included in the study. A threefold classification of children was used—(1) official delinquents, or those for whom there was a police or juvenile court record; (2) unofficial delinquents, or those for whom there was no official delinquent record but who were judged to be delinquent by the cooperating agencies; (3) nondelinquents.

The results of the survey were such that a number of rather definite conclusions could be drawn.

1. Boys participate in supervised recreation more than girls, as is indicated in Table 124. It was suggested that the programs "seemed to be designed primarily for boys."

¹ *Recreation and Delinquency*, Chicago Recreation Commission, 1942.

2. Nondelinquents participated in supervised recreation more than did official delinquents but not more than unofficial delinquents. (The unofficial delinquents were probably judged to be so largely by recreation supervisors who could observe and judge only those in recreation situations.) "The proportion of nondelinquents not in recreation who became delinquent was three times as high as the rate for nondelinquents in recreation." Recreation is slightly more popular with boys and girls in the nondelinquent area than in the four delinquent areas. (See Table 124.)

TABLE 124.—RECREATIONAL ACTIVITY IN FIVE AREAS IN CHICAGO

Areas	Per cent delinquent	Per cent active in recreation			
		Official delinquent	Unofficial delinquent	Non-delinquent	Total
1. Delinquency high:					
Boys.....	17.6	61.1	92.2	89.2	84.6
Girls.....	1.3	16.2	.....	28.8	28.6
2. Delinquency high:					
Boys.....	14.0	50.4	99.1	63.2	62.1
Girls.....	1.6	17.6	.....	41.5	41.1
3. Delinquency high:					
Boys.....	13.3	52.5	73.3	97.6	91.2
Girls.....	1.9	44.2	75.0	74.3	73.7
4. Delinquency high:					
Boys.....	14.1	43.9	94.4	89.1	82.8
Girls.....	1.8	17.3	90.9	40.2	40.0
Average, 1, 2, 3, 4:					
Boys.....	14.7	51.9	89.7	84.8	80.2
Girls.....	1.6	23.8	82.9	46.2	45.8
5. Delinquency low:					
Boys.....	6.0	34.8	100.0	95.9	91.9
Girls.....	.5	6.7	100.00	49.7	49.8

3. Approximately twice as much time is spent in movies as in supervised recreation. There was no difference between delinquent and nondelinquent children in this respect.

4. Boys under fourteen participate in recreation programs more than boys over fourteen.

5. Children in the four delinquency areas tend to limit their participation to only one of the four types of recreation studied—the park, the public playground, the private agency, or the community sponsored agency.

6. Most delinquents favor crime and mystery radio programs, while most nondelinquents prefer comedian and variety radio programs.

Consequently, it was recommended that more supervised recreation, especially for girls, be provided for all Chicago neighborhoods and that a special effort be made to interest boys over fourteen in beneficial spare-time activities.

In-school Training for Leisure.—Training for the beneficial use of leisure time can take place in the schoolroom by the proper kind of procedure. However, a procedure does not become effective leisure-time training merely by being labeled as such. Since the beginning of formal education, certain courses have been called "cultural" and were justified as appropriate training for leisure on the basis only of authoritative opinion. Thousands of American school children have been forced to wade through thousands of pages of reading matter that was too difficult for them to understand and entirely outside their field of interest. No one has ever proved that such material has any beneficial value, and much evidence is accumulating to indicate that it interferes with the later development of general reading habits. As a high-school boy once remarked, "If the *Sir Roger de Coverley Papers* are an example of what one should read during his leisure time, I would prefer to spend my life at hard work." Educators must realize that conversations in old English coffee shops more than 200 years ago can have but limited appeal to boys and girls who are now interested in the "jive" talk that goes on in the corner drug store. Townsend¹ found that the average date of publication of books that college students actually read in 1934 was the same year (1934), whereas the average date of first publication of books used in the literature courses was 1673. Education for leisure time must be realistic enough to start at least with boys and girls as they are, not as they have been traditionally and erroneously conceived to be.

A review of the research in education for leisure does not seem to indicate any solution of the problem. No one knows how to make classroom instruction appropriate for the most beneficial use of leisure time. We are pretty sure that the enforced study of uninteresting and disliked curriculum content is not good preparation for leisure, or for anything else. However, we are not sure, though it seems logical, that the willing study of interesting and liked curriculum content is good preparation for leisure. This is the assumption made by the progressive-education movement (and accepted by many authorities in education), but it is still an unproved inference.

¹ Townsend, A. N., What Professors Recommend and What Students Read, *Eng. J.*, 1935, 24, 144-145.

Lies¹ believes that classroom preparation for leisure, whether as a sitter (one who observes and appreciates) or as a doer (one who participates and produces), is essentially a product of *conditioning*. If a child can be made to enjoy his experiences (either as a sitter or as a doer) with games, reading, dramatics, music, art, handwork, nature study, and social relationships while in school, he is more likely to seek the same sort of experiences when he has some leisure time with nothing planned for it. The likes and dislikes, the interests and aversions, good habits and bad ones that children learn in the classroom will all carry over into postschool life. Certainly, this conclusion has psychological justification. The problem is how to proceed in the classroom in order to bring about this desired conditioning.

It has been found in practically all training for vocational activity that the effectiveness of a method of instruction depends largely on how practical and realistic it is. The laboratory method, the case method, the interne method, the project method—all are attempts to tie the school more closely to the vocation itself. Perhaps training for leisure would be more effective if it more closely simulated the leisure situation. Characteristic of leisure is the right to choose what shall be done and for how long. If the school used less coercion in its nonvocational phases, perhaps it would be more effective in training for nonvocational living. At any rate, a program of teacher-pupil cooperation in making decisions that so closely affect the pupil's own likes and dislikes could hardly be less effective in preparation for leisure living than the traditional methods have been.

Out-of-school Training for Leisure.—Unfortunately, the school day too often begins at nine and ends at four, in more ways than one. The school doors are closed and the libraries, gymnasiums, swimming pools, social rooms, and studios are unavailable. The teachers are unavailable. Even the school atmosphere and school influence seem to stay behind those locked doors. The school is too often a world bounded by two bells—one at nine and the other at four.

Certainly it would be unwise to lengthen the teacher's day. She is overworked now. Furthermore, open school buildings are needed for more than an hour or two after school. Public school equipment and facilities should be available to the public for at least 14 hours every day of the week including Sunday. The public schools have an obligation to the public that cannot be fulfilled between the hours of nine and four. At least two complete shifts of recreational personnel are needed to man a school system for greatest community service.

¹Lies, E. T., *The New Leisure Challenges the Schools*, National Recreation Association, New York, 1933.

When school buildings are open and available to the public under supervision, a wide range of leisure activities is available. Some of these are listed in Table 125.¹ The education for leisure that results from these activities thus occurs during leisure time and under leisure conditions.

TABLE 125.—RECREATIONAL ACTIVITIES POSSIBLE IF SCHOOL EQUIPMENT WERE AVAILABLE FOR MAXIMUM USE

<i>Sports</i>		
Base ball	Indoor tennis	Roller skating
Foot ball	Outdoor tennis	Ice skating
Basket ball	Table tennis	Skiing
Volley ball	Lawn tennis	Hockey
Hand ball	Deck tennis	Swimming
Soft ball	Shuffleboard	Camping
Badminton	Wrestling	Hiking
Darts	Boxing	Quoits
Archery	Track	Horse shoes
Bicycle touring	Cards	Pool
Auto touring	Chess	Billiards
Golf	Dominoes	Bowling
Fishing	Checkers	Calisthenics
Hunting	Field meets	Apparatus
<i>Social</i>		
Social dancing	Moving pictures	Picnics
Folk dancing	Benefit socials	Banquets
Holiday celebrations	House parties	
<i>Educational</i>		
Dramatics:	Music:	Art:
Classic	Orchestra	Painting
Melodrama	Glee clubs	Photography
Pageantry	Chorus	Sculpturing
Lecture recitals	Operetta	Public speaking:
Book clubs	Minstrel	Debating
Poetry clubs		Forums
Handicraft clubs		Lectures
Stamp collecting clubs		Panel discussions

Critics object to this extended use of school facilities on the basis of expense. The only expense would be for supervising personnel and for some additional wear on equipment. This would be a small fraction of the cost of maintaining boys and girls in delinquent institutions. However, no apologies need be made for the expense of such a program as long as it is no greater than that of the daytime school program. When leisure time equals vocational time, it is entitled to as much

¹ A more complete list is given in Butler, G. D., *Community Recreation*, pp. 206-212, McGraw-Hill Book Company, Inc., New York, 1940.

expenditure in preparatory training. Leisure hours are just as much a part of life as vocational hours.

The cost to society as a whole of such after-school use of school facilities would be less than that of any other way of taking care of such needs. Other agencies must duplicate buildings and equipment that the public already owns in the schools. It is a waste for society to provide gymnasiums, swimming pools, reading rooms, and dance floors at Y.M. and Y.W.C.A.'s for use by school children after school when the same equipment in the school buildings is idle. Education must be broader than 9 A.M. to 4 P.M. classroom instruction.

Such after-school use of school buildings would provide for the three fundamental requirements for effective leisure-time training—(1) variety in leisure opportunities, (2) freedom to choose the leisure activity, and (3) trained supervision. No other agency can offer such a variety of leisure activities as is possible with the widest use of public-school equipment. No other agency is better able to offer trained supervision in leisure activities than the public schools. They are already staffed with the best recreational supervisors available. A 14-hour school day would merely require an increase in staff.

In a study of young Maryland adults (ages sixteen to twenty-four) the American Council on Education found that 69.2 per cent of 13,528 individuals believed that recreation facilities were inadequate. Of these, 27.8 per cent suggested more playgrounds and parks, 20.3 per cent wanted more community centers, 15.9 per cent wanted more swimming pools, 10.5 per cent wanted more movies, 5.7 per cent wanted more education, 5.0 per cent wanted more dance halls, 4.4 per cent wanted more clubs, and 3.8 per cent wanted more supervision.¹ All of these could be furnished by the optimum use of school facilities after school hours.

LEISURE FOR ADULTS

A hundred years ago a New England shoemaker worked 72 hours per week and a weaver worked 84 hours. By 1928 both had been reduced to 48 hours per week, and in 1938 to 40 hours. Assuming that a man sleeps 56 hours per week, spends 14 hours in eating, and another 10 hours in toilet activities, he still has 48 hours per week with nothing else to do. A survey of the working hours per week of 25 industries, for the years 1914 to 1935, showed that the average work-week was 52.2 hours in 1914, 49.0 hours in 1925, and 37.6 hours in

¹ Bell, H. M., *Youth Tell Their Story*, American Council on Education, Washington, 1936.

1935.¹ Labor leaders and far-seeing industrialists have already envisaged the 30-hour week. This means that leisure time in the future will far exceed making-a-living time.

A hundred years ago "a woman's work was never done." Today, commercially prepared foods, mechanical labor-saving devices, and automatic temperature controls (air conditioning), have given the average housewife as much leisure as her husband. She, too, has time that is free of all required activity.

However, leisure time for both men and women can be made to enrich life or to impoverish it. It can benefit man or handicap him. The monk, Gregor Mendel, discovered the laws of heredity during his leisure time. The physician, Oliver Wendell Holmes, wrote *The Autocrat at the Breakfast Table* during his free hours. The school teacher, Alexander Graham Bell, invented the telephone in his spare time. The engraver, Alvin Clark, produced the first achromatic lens in America after a day's work was finished. The clergyman, Joseph Priestly, discovered oxygen during recreational activity. The Kansas farmer, Clyde Tombaugh, discovered the planet Pluto because he used his spare time in developing a useful hobby.

On the other hand, all the degradation and evil man has been able to conceive have been the product of leisure time. "The clinics and hospitals, the courts, jails, reformatories and prisons of America deal with thousands of human maladies that go back directly or indirectly to the wrong use of free time which was at the disposal of the people involved to do with as they saw fit."² It is doubtful if a long day's work is more detrimental to the welfare of man than a short work day with additional hours of idleness.

The leisure-time activities of the average American middle-class man consist of watching baseball games, playing an occasional game of pool or golf, mowing the lawn, reading the newspaper, and loafing. The average American woman belongs to a woman's club, reads cheap novels, attends movies, and plays bridge. Neither husband nor wife is benefited by leisure time, nor is he greatly harmed. Such activities are neither beneficial nor harmful. There are no goals to be reached, no values to attain, no tasks to accomplish, no benefits to seek, no ambitions to satisfy—just time to put in. Neither American men nor women are able to make intelligent use of the leisure time our civilization has thrust upon them. The fault can be laid to three sources—(1) the failure of our schools to educate for leisure, (2) the absence of

¹ Steiner, J. F., Research Memorandum on Recreation in the Depression, *Soc. Sci. Res. Council Bull.*, 32, 1937.

² Lies, *op. cit.*, p. 27.

adequately planned community programs for adult recreation and avocation, and (3) the strong advertising appeal of certain commercial leisure-time activities that are spectacular but shallow in lasting recreational values.

TABLE 126.—PERCENTAGE OF VARIOUS AGE GROUPS INDICATING INTEREST IN VARIOUS LEISURE-TIME ACTIVITIES

Activity	Ages									
	15-19		20-29		30-39		40-49		50-59	
	Male	Fem.	Male	Fem.	Male	Fem.	Male	Fem.	Male	Fem.
	(235)	(143)	(99)	(89)	(107)	(83)	(43)	(50)	(22)	(19)
1. Reading.....	43	72	81	83	78	87	77	82	91	89
2. Radio.....	41	47	53	47	44	60	67	50	68	37
3. Movies.....	28	39	32	32	34	36	32	22	27	26
4. Visiting.....	8	21	26	43	30	42	30	34	27	31
5. Sports.....	60	40	42	19	23	17	30	10	14	
6. Art or music	8	24	26	25	27	25	21	38	32	31

TABLE 127.—PERCENTAGE OF TIME SPENT IN VARIOUS LEISURE-TIME ACTIVITIES BY OUT-OF-SCHOOL YOUTH ACCORDING TO THE AMOUNT OF SCHOOLING COMPLETED

Activity	6th grade	7th or 8th grade	9th or 10th grade	11th or 12th grade	1, 2, or 3 years college	4 or more years college
Reading.....	11 5	17 9	23 3	32.2	42.6	42 9
Individual sports.....	12 4	13 6	15.9	15 6	15.2	18 4
Dancing, dating	12 6	10 9	15 5	14.0	10 4	8 3
Movies.....	9 4	12 8	13.4	10 2	8 8	7.6
Loafing.....	21 7	15 8	7 5	5 9	3 9	4 3
Hobbies.....	8.7	10 1	8 4	10 4	10 7	9 9
Team games.....	10 1	8.2	8.7	5 4	4 0	3 5
Listening to radio.....	2.8	2 4	2 3	1 8	9	1 0
Quiet games.....	2 2	1.8	1.0	7	.9	1 8
Other activities.....	8 6	6 5	4 0	3.8	3.2	2.3

Adults can spend leisure time profitably in a number of different ways. Versatile people do not limit themselves to one or two leisure activities but engage in a number of them. The way adults actually spend their leisure time is indicated in Table 126 from a study by Kelly.¹ Note the decreasing interest in sports with age and the

¹ Kelly, G. O., et al., *Woodside Does Read*, Queensboro Public Library, 1935.

increased interest in the more sedentary activities. Briggs¹ found that 23 per cent of a group of Missouri adults never attend church, 48 per cent never attend movies, 78 per cent never go to lodge or club meetings, 79 per cent do not attend dances, 79 per cent do not attend lectures, and 81 per cent do not hear concerts. In the study of Maryland young adults made by the American Council on Education (referred to above) it was found that the way people spend their leisure time depends on how much schooling they have had. The more schooling, the more reading and the less loafing (see Table 127 for these results).

TYPICAL PSYCHOLOGICAL STUDIES OF LEISURE ACTIVITIES

Reading is perhaps the easiest, and can be the most effective, way of spending leisure time. Too often it is devoted to comic strips, continued stories, pulp magazines, and other forms of nonbeneficial material. Johnson² studied the reading habits of adults in the Duluth

TABLE 128.—PERCENTAGE OF PUBLIC LIBRARY PATRONS WHO READ BOOKS, MAGAZINES, AND NEWSPAPERS

	Men		Women	
	Married	Single	Married	Single
	(N 300)	(N 210)	(N 257)	(N 133)
Books	22	22	24	42
Magazines	79	81	79	91
Newspapers	98	98	94	99

(Minnesota) Public Library and found that only about one in four ever read books of any kind. Single women read more books, more magazines, and more newspapers than any other group. See Table 128 for these data. The same investigation showed that the 10 most frequently read magazines for both men and women were of the popular variety containing short stories and occasional articles of more serious and beneficial nature. Note, in Table 129, that there is not a single heavy magazine (with idea articles only) in the first 10 for either men or women.

¹ Briggs, E. S., How Adults in Missouri Use Their Leisure Time, *Sch. & Soc.*, 1938, 47, 805-808.

² Johnson, B. L., Adult Reading Interests as Related to Sex and Marital Status, *Sch. & Soc.*, 1932, 40, 33-43

TABLE 129.—RANK ORDER OF TEN MAGAZINES MOST FREQUENTLY READ BY
MEN AND WOMEN
(Duluth, Minnesota, 1929)

Magazines	Men	Women
Liberty.....	2	5
Saturday Evening Post.....	1	3
Collier's.....	4	7
American Magazine.....	7	4
Literary Digest.....	5	
Ladies' Home Journal.....	8	1
Western Story Magazine.....	3	
Popular Mechanics.....	9	
True Story Magazine.....	6	
Detective Story.....	10	
Pictorial Review.....	..	2
Good Housekeeping.....	..	6
Woman's Home Companion.....	..	8
Cosmopolitan.....	..	9
McCall's Magazine.....	..	10

TABLE 130.—PERCENTAGE OF MEN AND WOMEN WHO READ VARIOUS SECTIONS
OF NEWSPAPERS
(Duluth, Minnesota, 1929)

Section	Men	Women
Front page.....	95	93
News of your city.....	86	83
Accident news.....	81	79
Comic section.....	79	78
News inside paper.....	78	77
Crime news.....	72	67
National news.....	71	65
Editorial page.....	59	57
Foreign news.....	56	51
Sports page.....	67	43
Advertisements.....	35	50
Society news.....	15	36
Financial section.....	29	22
Home page.....	13	31
Serial story.....	10	14
Children's page.....	9	15
Book reviews.....	12	12
Horoscope.....	9	13
Puzzles.....	10	12

Johnson also studied the page traffic for each section of the newspapers. He found that the comic section ranked fourth for both men and women and that crime news is read more than national news, the editorial page, and foreign news. These data are shown in Table 130.

Miller¹ studied the reading interests of adults in a good residential district in Chicago and those in a poor area. The people in the good area were typical middle-class Americans—native-born, varied occupations, varied religions, low delinquency rates, and self-supporting. Those who lived in the poor area were more crowded, foreign-born, Catholic in religion, bilingual, illiterate, and on relief. It was found that the people in the good area read 2.68 times as many magazines, 2.06 times as many books, and 1.58 times as many newspapers. Less than half the books read in the good area were of the cheap type while 85 per cent of those read in the poor area belonged to this classification. Those who lived in the good area read 16 times as many of the better magazines, while those in the poor area read twice as many of the pulp magazines. Both the quantity and quality of reading were superior in the better residential district.

Gray and Munroe² made a survey of the reasons a group of 410 students and professional people read during their leisure time. A total of 3,323 reasons were given. Twenty-eight per cent wanted to satisfy curiosity, 20 per cent wanted relaxation, 11 per cent wanted emotional enjoyment, 9 per cent wanted culture, 8 per cent wanted vicarious experience, 7 per cent wanted vivid descriptions, 7 per cent wanted atmosphere, and the rest read for miscellaneous reasons, such as to "idle away time," and because of a "feeling of duty."

Reading is obviously a profitable and inexpensive way to spend leisure time. Our schools should more adequately prepare pupils for leisure-time reading and our communities should provide more adequate facilities for profitable and enjoyable reading.

The activity most commonly thought of in connection with a leisure-time program is some form of sports. No other nation in the world has equaled America in the development of both amateur and professional sports. Nazi Germany developed sports as a means of promoting its military program; Americans play baseball just because they enjoy it. It is an end in itself. In one city alone (Minneapolis) in one year (1937), more than a quarter million people engaged in city-

¹ Miller, R. A., *The Relation of Reading Characteristics to Social Indices*, *Amer. J. Sociol.*, 1936, 41, 738-756.

² Gray, W. S., and Munroe, R., *The Reading Interests and Habits of Adults*, The Macmillan Company, New York, 1929.

sponsored amateur sports and more than three quarters of a million people were spectators. "In addition, 132,861 rounds of golf were played on 5 municipal courses; the attendance at 201 tennis courts totaled 321,600 during 'free play' periods; 54 ice-skating rinks provided more than 2 million individual skating periods, and the total attendance at the 4 park beaches was 647,000 during the year." However, we have merely scratched the surface in developing a sports program adequate to take care of the leisure-time needs of a nation of more than 135 million people.

The value of sports, in comparison with the older and more formalized calisthenics and apparatus procedure in developing physical fitness, has been carefully studied by Wilbur.² He divided a class of 369 freshmen college boys into two groups and taught one by using apparatus (parallel bars, tumbling mats, climbing ropes, horizontal ladder, Swedish vaulting box, side horse, horizontal bars, and rings) and the other group by using sports (boxing, wrestling, track and field, soccer, and swimming). He carefully measured the groups three times with a battery of physical fitness tests. The superiority of the sports program at the end of the course was definitely significant (see a summary of results in Table 131).

TABLE 131.—PHYSICAL FITNESS TEST SCORES OF TWO GROUPS TAUGHT BY DIFFERENT METHODS

Tests	Apparatus group		Sports group		Critical ratio
	Mean	S.D.	Mean	S.D.	
Beginning group.....	275.3	50.2	276.0	51.3	.13
Mid-semester group.....	303.3	53.5	309.1	50.3	.94
Final group.....	318.6	37.4	341.8	37.0	5.96

Sperling³ studied the relation between the behavior adjustment of a small group (171) of athletes and a smaller group (125) of nonathletes. The athletes were definitely superior, *i.e.*, they had lower scores, or fewer troubles. With one exception, the resulting differences were all statistically significant (see Table 132).

Most authorities advocate hobbies as a desirable form of

¹ Butler, G. O., *Community Recreation*, p. 322, McGraw-Hill Book Company, Inc., New York, 1940.

² Wilbur, E. A., A Comparative Study of Physical Fitness., *Res. Quart.*, 1943, 14, 326-332.

³ Sperling, A. P., Relationship between Personality Adjustment and Achievement in Physical Education, *Res. Quart.*, 13, 351-363.

leisure activity. A hobby, or an avocation, is defined as any form of leisure specialization. A person has a hobby when he engages in leisure activity long enough to become specialized in it.

TABLE 132.—MEAN BEHAVIOR-TROUBLE INVENTORY SCORES FOR ATHLETES AND NONATHLETES

	Athletes	Non-athletes	Critical ratio
Human Behavior Inventory (R. B. Smith)			
Total test.....	113	1463	8.19
Work Efficiency....	12.4	14.9	4.0
Superiority-Inferiority.....	13.5	18.0	7.34
Social Acceptability.....	15.2	20.7	7.23
Emotional Stability.....	27.7	36.8	7.34
Objectivity.....	17.7	19.1	1.79
Family Relationship.....	27.9	36.1	5.94

Boynton¹ studied the relation of hobbies to the personality traits of 2,342 boys and 2,457 girls in 258 schools located in 31 states. Only some of his data were statistically significant. Among boys he found that dependability is significantly related to study, music, travel, and religion; it is negatively related to dramatics and no hobby. Sense of humor is related to music; over-all good personality is related to religion, fancy work, reading, and travel. Among girls he found that dependability is significantly related to study, music, scouting, and dramatics; friendliness is related to club membership and social dancing; and over-all good personality is related to study, music, dramatics, and social activity. He found statistically significant differences between certain hobbies: any hobby is better than no hobby; studying and collecting are both better than reading funnies, playing active games, and attending movies; and for girls, reading funnies is better than reading novels.

SUMMARY

It is significant that scientific research has permeated three fields of human behavior that are traditionally thought of as being remote from science. True, the measuring instruments are crude and the research is unconvincing when compared with that in the more basic sciences, but it is the first step toward reducing music, art, and play to a meaningful status.

¹ Boynton, P. L., The Relation of Hobbies to the Personality Characteristics of School Children, *J. Exp. Educ.*, 1940, 8, 636-637.

In the discussion of music, the basic psychological principles as stated by Seashore were reviewed. Then, the better known music tests were described. However, it is doubtful if any of them are sufficiently reliable and valid to be useful for more than rough screening. Certainly individual diagnosis on the basis of data secured by these tests must be done with the utmost caution.

Art ability has been rather keenly diagnosed by Meier. The six significant factors were stated and briefly discussed. Three art tests were described, and two intelligence tests by the use of drawings were reviewed. The few research studies briefly presented indicate that interesting and significant investigations in this field will probably occur in the near future.

The psychology of leisure is yet very indefinite. Little progress has been made toward refining research procedure and developing a set of basic psychological principles. However, the problem is so immediate that application of some procedure cannot await research. One of our greatest national problems is how to use leisure time beneficially.

RECOMMENDED SUPPLEMENTARY READINGS

- BELL, H. M.: *Youth Tell Their Story*, American Council on Education, Washington, 1936.
- BUTLER, G. D.: *Community Recreation*, McGraw-Hill Book Company, Inc., New York, 1940.
- MEIER, N. C.: Factors in Artistic Aptitude, *Psychol. Monogr.*, 1939, **51**, 140-158.
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- SEASHORE, C. E.: *Psychology of Music*, McGraw-Hill Book Company, Inc., New York, 1938.

CHAPTER XIII

PSYCHOLOGY IN INDUSTRY—EMPLOYMENT¹

- The Employment Problem
 - Cost of Faulty Placement
 - Types of Evidence in Employment
- The Employment Interview
 - Agreement among Interviewers
 - Agreement between Interviewers and Supervisors
 - Standardizing the Interview
 - Training Interviewers
 - The Stress Interview
- Personal Data in Employment
 - Evaluation of Personal Data
 - Analysis of Personal Data—Manual Occupation
 - An index of Employability
 - Analysis of Personal Data—Sales Occupation
 - Some Limitations of This Approach
- Employment Tests
 - Fundamental Concepts
 - Types of Employment Tests
 - Evaluation of Employment Tests
 - Tests for Clerical Occupations
 - Tests for Mechanical Occupations
 - Tests for Unskilled Occupations
 - Tests for Technical Occupations

THE EMPLOYMENT PROBLEM

The world works for a living. Practically all able-bodied adults spend a major portion of their waking hours at work for pleasure or profit. If the science of psychology is pertinent to practical human affairs, then it must have something to contribute regarding this economically and emotionally significant segment of human behavior.

In approaching the problem of employment the first necessity is to comprehend the great size, diverse nature, and surprising instability of the employee population. In earlier days the world of work was relatively simple in that a few basic occupations such as agriculture, husbandry, fishing, and weaving accounted for most of man's work activities. In present days of specialization and technical develop-

¹ This chapter was written by Stanley E. Seashore, of McKinsey, Kearney & Company 135 LaSalle St., Chicago, Ill.

ment, however, work areas have been broken down into successively smaller portions. A representative example is seen in the iron and steel industry, which once was a single occupation, one man doing all of the necessary operations, while today there are about 5,000 separate occupations in this industry alone.¹ A Dictionary of Occupational Titles,² published in 1939, lists 17,452 separate occupations, yet the introduction to this volume asserts that the list is by no means complete. The things people do for a living are truly strange and varied.

TABLE 134.—TOTAL EMPLOYMENT, TERMINATION RATE, AND ACCESSION RATE FOR NONAGRICULTURAL CIVIL ESTABLISHMENTS IN UNITED STATES*

Date	Total employment	Termination rate (% per month)	Accession rate (% per month)
August, 1943.....	38,240,000	8 12	7 52
August, 1942.....	37,789,000	7 06	7 90
August, 1941.....	36,528,000	4 14	5 43
August, 1940.....	36,000,000	3 00	6 63
August, 1939.....	34,870,000	3 01	5.06

* Data from *Monthly Labor Review*, November issue of each year indicated.

Some comprehension of the size of the employee population can be gained from an examination of Table 134, which shows that in 1943 over 38 million persons were gainfully employed in nonagricultural civil establishments in the United States. The instability of this employee group is shown by the termination rates and accession rates in the same table. From these data it is evident that in August of 1943, 2,868,000 of these people secured new employment. Extended to an annual basis, it appears that there were approximately 34 million job changes in the American business and industrial population not including promotions, transfers, and other internal job changes. While these figures are distorted to some extent by wartime conditions, earlier data bear out the conclusion that the American worker chooses, or is forced, to change his employment at intervals that may average nearly one change for each worker each year. The effective employment of this great mass of people in such a way as to fill the economic and psychological needs of both employee and employer is a problem of great magnitude.

¹ *Job Descriptions of the Iron and Steel Industry*, 25 vols., American Iron and Steel Institute, New York City, 1943.

² United States Employment Service: *Dictionary of Occupational Titles: Part I, Definition of Titles*, Government Printing Office, Washington, 1939.

COST OF FAULTY PLACEMENT

Many of the millions of persons annually employed on new jobs are victims of faulty placement in that they fail to suit the employer or fail to gain from their new jobs the satisfactions that they are seeking. There are several sources of evidence pointing to this conclusion.

TABLE 135.—CAUSE FOR TERMINATION OF EMPLOYMENT*

Cause	1943, %	1939, %	1936, %
Discharge.....	8	4	6
Quit.....	71	25	33
Leave of absence.....	11		
Lay-off.....	8	71	61
Other	2		

* Data from *Monthly Labor Review* for years indicated.

The termination data mentioned above are based upon terminations for a variety of reasons, including discharge, voluntary quitting, military leave of absence, and lay-off for lack of work. According to Department of Labor reports for representative years, the proportions are as shown in Table 135. While some terminations are involuntary (lay-off and military leave of absence), a substantial percentage are voluntary and represent instances where performance has been so grossly inadequate as to warrant discharge or where the employee is dissatisfied with the conditions of his employment. Inadequate employment methods and faulty placement figure largely in these causes of occupational maladjustment. The employer bears the high cost of training for replacements while the terminated individuals bear the heavy cost of periodic unemployment and of major readjustments in family, social, and personal way of living.

Not all faulty placement leads to termination of employment, for it is customary in American business and industry to continue the employment of some workers whose productivity is below a profitable level. In one group of experienced typists, for example, all working on similar materials, production records showed that the slowest typist produced 60 per cent of an arbitrary standard while the best typist produced 102 per cent of this standard amount. Both typists received the same pay yet the cost to the employer per finished sheet was nearly double for the poor operator. This is a hidden cost of faulty placement. Table 136 shows the ratio of productivity between best and poorest workers for a few other types of employment. These figures

suggest that among experienced workers in typical occupations the best worker is likely to produce about twice as much as the poorest worker. Among inexperienced or inadequately selected groups these differences are, of course, much greater.

TABLE 136.—COMPARISON OF PRODUCTIVITY BETWEEN BEST AND POOREST WORKERS IN VARIOUS OCCUPATIONS

Occupation	Production best	Production poorest	Ratio	Source
Hosiery looping..	7 doz. per hr.	3.25 doz. per hr.	1:2.15	Tiffin, Joseph, <i>Industrial Psychology</i> , p. 6, Prentice-Hall, Inc., New York, 1942.
Electrical fixture assembling.	1 4 5 % of average	60% of group average	1:2.4	Tiffin, p. 4.
Planer operation.	.9 hr. to complete standard job	3.6 hr. to complete standard job	1:4	Original study
Drill press operation.	.5 hr. to complete standard job	2.1 hr. to complete standard job	1:4	Original study
Ironing shirts....	213 sec. per shirt	279 sec. per shirt	1:1.3	Laird, D. A., <i>The Psychology of Selecting Employees</i> , p. 37, McGraw-Hill Book Company, Inc., New York, 1937.
Machine book-keeping.	140 "production score" based on standard time allowance	94 "production score"	1:1.5	Hay, E. N., <i>Predicting Success in Machine Bookkeeping</i> , <i>J. Appl. Psychol.</i> , 1943, 27, 492.

Data such as these suggest the amount of financial gain that employers and employees can achieve through proper selection and placement. Such data also lead one to wonder about the welfare of the marginal worker who continues indefinitely at his work, insecure both from a psychological and economic point of view. The records of mental hospitals and of criminal and domestic courts bear out the thought that many serious personal maladjustments have their origin in part in occupational maladjustment. The objectives in applying psychological techniques to the employment problem are, accordingly, to reduce unnecessary job changes, to ensure the placement of workers

in jobs they can perform effectively, and to ensure placement in jobs that may provide necessary personal satisfaction and security.

TYPES OF EVIDENCE IN EMPLOYMENT

Most business and industrial firms have a standard procedure that is followed in the employment of new personnel. A typical procedure is likely to include the following steps:

1. The applicant applies for work and is given a brief preliminary interview.
2. The applicant fills out a detailed form presenting his personal characteristics and background.
3. The applicant may be given appropriate vocational tests.
4. The applicant is given a more thorough interview.
5. The applicant may be referred to a prospective supervisor for further interview.
6. A physical examination is given.
7. The applicant is registered as an employee and is scheduled to work.

The first six of the above steps are designed, through varying methods, to get information about the applicant. The employer goes to great length to secure the evidence that will determine his decision to employ or reject the applicant. If several positions are open, the employer will go to equally great length to determine the type of work in which the particular applicant can best be utilized. The interviews, the personal-history record and the tests, both vocational and medical, provide the evidence on which an applicant is accepted or rejected. How accurate is this evidence? How dependable is it in the important business of employment? The following pages discuss some of the psychological methods and experiments that have contributed to our understanding and improvement of the employment process.

THE EMPLOYMENT INTERVIEW

The interview is without question the most fundamental part of the employment procedure. Usually an interview is the basis for a decision with respect to an applicant's capabilities and personal qualities and is the basis for a final decision with respect to job placement. Because interviewing is used universally in this way critical thought should be given to the dependability of the employment interview and to improvements in procedure that may enable the interviewer to do his task with greater accuracy.

Employment interviews are conducted for a variety of reasons and in a variety of ways, determined by the circumstances in which inter-

viewing takes place. The most common purpose is to obtain personal data about the applicant and to inquire in detail about general facts that have been noted on an application blank. Other purposes are to inform the applicant regarding the nature of the work available and to form an estimate of personal qualities that are not ordinarily revealed through means other than personal contact.

The actual conduct of the interview is not standard. Some of the variations that have appeared in the experience of employment interviewers are noted below:

1. Some firms provide not a single interview but a series including, possibly, (a) a very brief preliminary interview during which the obviously unqualified or disinterested applicants are rejected, followed by (b) one or more intermediate interviews, somewhat more thorough, during which a decision is made regarding employment, and after the new employee is signed up, there is often (c) a final interview during which the new employee is given additional details with respect to work procedure, responsibilities, place of work, and other items necessary for a new employee.

2. While most employment interviewers confine their investigation to superficial aspects of the applicant's personal characteristics or personal history, others make an attempt to get at fundamental personality traits or behavior patterns which are not evident in the ordinary interview and which may be of critical importance in the occupational success of the applicant.

3. Some interviews have a standard sequence of questions that they follow more or less rigidly to permit a better comparison of applicants, while others avoid artificial control or direction on the theory that the use of standard questions tends to destroy the spontaneity and flexibility that is the essential characteristic of the interview.

4. The duration of the employment interview varies considerably. Periods ranging from 3 to 40 minutes are not uncommon, depending upon the time available and the type of position to be filled.

5. The manner of reporting and recording interview results permits much variation. Some interviewers keep no record whatever, while others maintain a narrative report or a summary rating.

6. Most interviews are conducted individually; *i.e.*, two people discuss the matter mutually. On the other hand, some are conducted by a committee of interested persons.

Several methods have been devised for the systematic study of interview methods and interview results. One of the earliest and most frequently used methods was to have applicants interviewed by a number of interviewers in order to determine how well they could agree

in their conclusions. Others have attempted to estimate the accuracy of employment interviews by comparing the interviewer's judgment with some objective evidence of subsequent success or failure on the job.

These methods for checking the reliability and validity of interviewing are illustrated in the pages that follow.

AGREEMENT AMONG INTERVIEWERS

One of the earliest studies of the interview was carried out by Scott, Bingham, and Whipple in 1916.¹ This study gave clear-cut and somewhat startling results and consequently it will be presented here in some detail. The cooperation of 23 interviewers was secured, 20 of these men being sales managers regularly engaged in the interviewing and selection of new employees. Twenty-four applicants for sales positions presented themselves to each of the 23 interviewers. The interviewers were permitted to use any method of their own choosing and were required only to rank the applicants in order with respect to their probable success at selling. Through this method it was possible to secure the judgments shown in Table 137, as to the relative qualifications of 24 applicants according to the views of 23 typical interviewers.

This table reveals a wide range of opinion among the interviewers with respect to any given applicant. Applicant A, for example, was considered the best by one interviewer and was ranked 22 by another interviewer. On some applicants, however, the range of opinion was considerably less; e.g., applicant E's rankings ranged from 15 to 24. This seeming lack of agreement, however, is balanced by the fairly close correlation between individual interviewers' judgments and the average ranking. Interviewer *v* produced rankings that correlated .85 with the average ranking, whereas interviewer *u* produced rankings that correlated only .55, indicating relatively low agreement with the judgment of other interviewers. From these data it can be concluded that interviewers will disagree in individual cases yet some of them, presumably more skilled, will show remarkable agreement with the group judgment.

Similar studies have been carried out by several other experimenters. In these cases the results were essentially similar although the experimenters' interpretations varied somewhat.

AGREEMENT BETWEEN INTERVIEWERS AND SUPERVISORS

Some have contended that results such as those just described are faulty in that the consistency found in interviewers' judgments may be

¹ Described in Bingham, W. V., and Moore, B. V., *How To Interview*, 3d ed., pp. 100-103, Harper & Brothers, New York, 1941.

TABLE 137.—SHOWING RANKINGS ASSIGNED TO TWENTY-FOUR CANDIDATES FOR SELLING POSITIONS BY EACH OF TWENTY-THREE INTERVIEWERS

Applicants	Interviewers																							Av.	Range	
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w			
A	13	14	12	11	18	7	3	19	1	4	4	8	5	5	18	5	16	22	10	11	1	5	19	1-22		
B	2	8	7	7	12	7	3	13	6	1	2	2	3	3	7	1	3	2	10	11	4	12	4	1-12		
C	23	22	17	2	11	20	20	13	12	7	15	14	11	24	23	12	19	11	10	5	24	11	7	2-24		
D	18	21	8	8	9	9	14	..	18	2	15	14	17	2	19	15	15	6	5	24	7	10	17	13	2-24	
E	22	19	16	24	17	23	22	..	18	22	23	19	20	17	18	19	23	18	23	17	22	15	23	24	15-24	
F	20	23	15	23	14	15	9	22	21	24	15	19	23	20	14	21	22	23	16	21	15	20	21	21	9-24	
G	11	13	16	13	12	18	16	16	24	12	15	23	22	22	12	22	17	17	16	11	10	18	21	19	10-24	
H	15	24	24	20	23	23	23	22	23	23	15	19	24	7	23	10	24	24	16	17	14	20	22	23	7-24	
I	16	11	6	18	15	20	23	11	20	9	23	15	13	18	7	20	20	16	17	14	19	14	17	17	6-23	
J	12	17	21	19	19	17	14	22	16	15	15	23	15	15	18	24	21	19	..	17	13	23	9	20	9-24	
K	10	9	20	21	21	22	14	14	3	..	15	5	9	19	3	15	5	21	23	15	17	14	15	14	3-23	
L	7	5	9	3	16	11	3	10	8	..	15	12	8	3	3	19	12	4	10	2	2	9	13	6	2-19	
M	14	12	23	22	21	24	20	19	21	15	23	19	21	22	3	23	13	15	26	21	17	22	24	22	12-24	
N	8	6	1	6	3	4	3	16	1	4	4	5	4	12	3	9	9	3	1	5	11	7	11	3	1-16	
O	21	13	18	17	16	19	14	12	14	12	15	19	10	16	15	12	14	8	21	17	17	21	18	16	8-21	
P	9	18	3	4	4	1	3	1	15	18	7	2	18	7	2	2	2	7	2	3	6	5	10	5	1-18	
Q	5	16	11	14	5	6	9	9	9	2	2	19	2	22	12	..	..	10	10	1	4	5	8	8	1-22
R	4	4	10	7	7	3	9	7	12	15	15	8	19	10	7	10	9	1	16	14	3	1	3	7	1-19	
S	17	20	22	15	21	10	14	16	17	20	7	19	16	13	18	15	9	14	19	21	22	17	6	18	6-22	
T	3	3	1	10	5	5	3	2	7	7	2	5	6	1	3	6	1	9	5	11	20	2	2	1	1	1-20
U	5	2	5	1	1	2	9	5	4	9	15	2	6	13	10	3	3	16	10	7	8	3	1	4	1-16	
V	1	3	19	13	1	12	14	4	10	18	15	8	9	10	3	8	9	13	5	4	17	8	12	9	1-18	
W	19	10	14	..	8	17	7	7	5	20	7	8	9	7	9	..	..	..	2	..	8	13	16	11	2-20
X	.77	.69	.70	.82	.76	.78	.81	.76	.76	.59	.69	.83	.72	.55	.69	.74	.81	.67	.63	.69	.55	.85	.69			

* Small letter at top of each column indicates an interviewer; large letter at left of each line indicates an applicant; columns at right show average rankings of the applicants and the range of rankings given to each applicant. Bottom line shows coefficient of correlation between each column and the average column.

due to the interviewers having stereotyped attitudes, possibly erroneous, about the ideal characteristics of a salesman. One possible check on this criticism is to compare the interviewer's judgment with actual job performance. One such study has been completed in connection with the employment of clerical workers in a large steel company.

In this situation three interviewers were engaged in employing women for a variety of typical office positions such as file clerk, typist, messenger, stenographer, and calculator operator. These interviewers had no special training other than familiarity with the company's business and some experience on their job. Brief interviews were allotted to each applicant, the interviews ranging from 3 minutes to 15 or 20 in accordance with the interviewer's judgment. At the conclusion of an interview the applicant was rated with respect to her suitability for each of the jobs for which she was to be considered. Following the interview and rating, these applicants were given vocational tests and further interviews prior to employment. Those actually employed were rated after 90 days by their immediate supervisor with respect to their ability, performance, cooperativeness, and initiative.

TABLE 138.—RELATIONSHIP BETWEEN INTERVIEWER'S PREDICTION OF SUCCESS AND SUPERVISOR'S REPORT OF SUCCESS.
(99 women clerical workers)

Interviewer's rating	Supervisor's rating		
	Per cent unsatisfactory	Per cent average	Per cent superior
Group A (average rating)	3	66	31
Group B	0	65	35
Group C	0	47	53
Group D	0	31	69
Group E (highest possible rating)	0	0	100

A comparison of the interviewer's ratings with the supervisory rating produced the results shown in Table 138. In this table each horizontal line represents a group of employees, group A being those receiving "average" ratings from the interviewer and Group E being those receiving the highest possible rating from the interviewer. (Employment was granted only to applicants rated "average" or better). Each group is divided to indicate "superior," "average" or "unsatisfactory" performance after 90 days of employment. It is evident from this table that applicants rated most favorably by the inter-

viewer have a substantially higher probability of superior performance than those with average ratings. The only unsatisfactory performance ratings were assigned to individuals in group A who were given "average" ratings by the interviewers. The agreement between the interviewer's judgment and the supervisor's rating is shown by a correlation coefficient of .62. This compares favorably with the predictions achieved by other employment devices and suggests that the interview, whatever its weaknesses may be, is in this instance functioning in a useful way.

STANDARDIZING THE INTERVIEW

Some experimenters have attempted to improve the interview by establishing a standard series of questions and a standard method for evaluating the responses given by the applicant. One of the most thorough attempts along this line was carried out by Hovland and Wonderlic in connection with the selection of employees for the Household Finance Company.¹ Based upon a preliminary experiment, a Diagnostic Interviewer's Guide was developed with a series of questions of proved value in differentiating the better applicants from the poorer ones. The questions were grouped into four sections, *viz.*, work history, family history, social history, and personal history; and spaces were provided for recording responses to each of the 37 questions. Following each section of the guide was a series of questions that the interviewer could answer to rate the applicant. On the basis of these ratings an interview score was calculated.

The reliability of this guide in use was estimated in one instance by having a group of applicants interviewed and rated separately by different interviewers. A correlation of .71 was obtained with 23 cases. On a larger number of cases, the reliability was checked by calculating the internal consistency of the records. This method gave a coefficient of .57 for the work-history section, .46 for personal history, and .25 for each of the remaining two sections, with a total reliability index of .82. Reliability of this degree is considerably higher than that ordinarily expected from an interview and compares favorably with the reliability of other psychological instruments that have been widely accepted.

The validity of the Diagnostic Interviewer's Guide has been checked in two ways. In one instance the scores of 100 individuals remaining in employment were compared with the scores of 100 individuals who had been dismissed. A statistically significant differ-

¹ Hovland, C. I., and Wonderlic, E. F., Prediction of Industrial Success from a Standardized Interview, *J. Appl. Psychol.*, 1939, 23, 537-46.

ence in total score was shown between the averages of the two groups. The other test of validity was made by examining the records of 300 individuals subsequent to employment. Interview scores were divided into five categories, and the percentages of those still on the job, those resigned, and those dismissed were examined for each of the five categories. The results indicated a progressive increase in the percentage of satisfactory employees corresponding to increasingly higher interview scores.

TRAINING INTERVIEWERS

It is believed by many that interviewers can increase their skill and their accuracy of judgment substantially by experience and special training. One significant attempt to study this question was made by the Industrial Relations Association of Philadelphia during 1940-1941 under the direction of Driver.¹ For this research a special observation room was provided that resembled an ordinary interview room but had a one-way screen permitting observers to hear and see the proceedings without themselves being seen or heard. A group of employment managers and others interested in the problem devised a list of traits to be observed during interviews and also devised a method for rating each applicant who was interviewed in this experimental situation. A group of applicants, unaware of their being observed, were then each interviewed by one of these experienced personnel managers while the others observed the course of the interview and rated the applicant on the basis of facts brought out or observed in the interview.

Under these conditions improvement was observed in the consistency of ratings given by the various persons participating. In the course of the experiment the deviation of individual ratings from the group average was reduced 36 per cent. This presumably indicates that the controlled practice and group discussion of interviewing problems provided a clearer terminology and more thorough interviewing method that resulted in greater uniformity of judgment. Since the study has not yet been completed the ultimate degree of agreement has not been determined.

The applicants were rated on a number of individual qualities that proved unlike in the consistency with which they could be rated. While the results were inconclusive there was evidence for believing that interviewers in general are better able to judge those qualities for which objective data are brought out in the interview. For

¹ Driver, R. S., *Research in the Interview*, pp. 20-31, American Management Association, No. 112, Office Management Series, 1944.

example, such qualities as "ability to learn abstract material" and "ability to deal with other individuals" were rated with greater agreement than such qualities as "dominance" and "self-confidence."

The third significant observation developed from this experiment concerns the inability of most of the interviewers, in spite of their practical experience and special training, to describe the basis on which their judgments were formed. Employment interviewing, it appears, is still an unsystematic, intuitive function for many personnel managers.

THE STRESS INTERVIEW

The employment interview situation is inherently artificial and thereby prevents the fair observation of some variations in individual behavior that may be very significant for performance on the job. The typical applicant is primed for the interview, and if he is an experienced job-seeker he has a good idea of what will be asked and the responses that will be noted favorably by the interviewer. Some individuals presumably have developed skill in the art of being interviewed, whereas others may be at a disadvantage with no special reference to their suitability for the position they are seeking. The experiment described below was designed to include in the interview some unusual factors that permit an interviewer to observe an applicant's behavior under unusual emotional stress.¹

Following preliminary experiment an interview procedure was worked out consisting of the following phases:

1. "Control questioning" during which the candidate is given the usual friendly questioning by a committee of interviewers.
2. A phase of "control action" during which the candidate performs a difficult manual test in the presence of the committee.
3. A "stress questioning" period during which "the atmosphere of the interview quickly snaps from one of friendly interest to one of cold disdain."
4. A period of "stress action" in which the candidate is required to repeat the manual test, this time with an unfriendly atmosphere and confusing interruptions to increase the emotional stress.
5. A "recovery" phase in which the candidate is eased back into the friendly atmosphere that characterized the opening of the interview.
6. A "post-interview" phase in which the candidate is given assurance that the seeming animosity of the interviewers was not personal and was used merely to note his reactions.

Members of the interview committee were trained for their task by

¹ Freeman, G. L., Manson, G. E., Katsoff, E. T., and Pathman, J. H., The Stress Interview, *J. Abnorm. Soc. Psychol.*, 1942, **37**, 427-447.

practice interviews and by discussion of the procedure. Each interviewer individually prepared ratings of the behavior of each applicant during the control period of the interview and also during the adjustment period. Two groups of men were interviewed, one (group *A*) consisting of 22 applicants for positions as patrolmen, and one (group *B*) consisting of 20 experienced men seeking an assignment in Civilian Defense Traffic Control.

The results of this experiment permitted estimates as to both the reliability of the interviews and their validity. Table 139*A* shows the intercorrelation among the total ratings for five interviewers in group *A*. It will be noted that these correlations approximate .80 which is considered unusually high for interview reliability. Table 139*B* shows similar intercorrelations for group *B*. In this case the figures were somewhat lower, especially in the case of interviewer 6 whose ratings did not correspond well with those of other interviewers. However, even with group *B* the total score reliabilities are sufficiently high to encourage individuals who are concerned with the use of interview methods in employment.

TABLE 139.—RELIABILITY OF RATINGS FOR PATROLMEN AND TRAFFIC CONTROL OFFICER APPLICANTS

A. Total Stress Interview Ratings, 22 Patrolmen Applicants

Rater	2	3	4	5
1	77	86	79	.84
2		82	82	.80
3			86	.81
4				.72

B. Total Stress Interview Ratings, 20 Traffic Control Officer Applicants

Rater	1	5	6	7
2	79	74	81	.80
4		.86	.40	.82
5			.33	.66
6				.42

C. Instructors' Ratings, 20 Traffic Control Officer Applicants

Rater	2	3	4
1	42	67	.34
2		47	.34
3			.64

With group *B* it was possible to compare the reliability of the interview ratings with the ratings given to the group subsequently by instructors at the Northwestern University Traffic Institute. Table 139C shows the reliability of the instructors' ratings. It will be noted that these ratings have considerably lower reliability than those made by the interviewers. This is somewhat surprising in view of the fact that the interviews lasted about 25 minutes, whereas the instructors had worked closely with the men for a considerable period of time. There appears to be greater agreement among trained raters in a controlled interview situation than among relatively untrained raters who have a wider opportunity for observation, although this difference may be due in part to a difference in the nature of the traits rated.

An estimate of the validity of the stress interview in connection with Group *B* was obtained by correlating the interview ratings with rank order ratings based upon the performance of the patrolmen during their previous years of service on the job. The validity of the interview ratings based on the "control (non-stress)" interviews was .74; the validity of "stress" ratings was .33, and the validity of the total interview ratings was .50.

The primary conclusion that can be drawn from this experiment is that during a brief interview of controlled content it is possible for trained raters to achieve a high degree of consistency in their opinions and that these opinions correspond favorably with actual job performance. However, the contribution of the stress factor that was inserted in the interview procedure is not clear and must await further experimentation under a variety of circumstances before becoming a practical addition to present interviewing methods.

PERSONAL DATA IN EMPLOYMENT

A person applying for work is very likely to be confronted with an application form. It is almost universal practice among organizations regularly employing new personnel to have a questionnaire on which the applicant may state the type of work he prefers, his qualifications, and his personal history. These forms range from brief registration cards to formidable four-page forms bristling with fine print and legal phrases.

There appears to be little uniformity in the information required in application blanks. Some of the most frequently used items are given in Table 140. Most forms have, in addition, a number of items that are of special importance to the firm in question or are believed by the employment manager to be of some special significance in the evaluation of an applicant's qualifications. Many of the questions are used

primarily to identify the applicant and to aid the mechanics of employment (*e.g.*, name, address, social security number); others are included primarily to accommodate legal and company policy limitations in employment (*e.g.*, age, citizenship, relatives in company); the remaining items are designed primarily to serve as indicators of the applicant's probable success on some job (*e.g.*, previous employment, education, physical impairments). Some items, of course, may serve all three purposes.

TABLE 140.—QUESTIONS MOST FREQUENTLY ASKED ON 40 REPRESENTATIVE APPLICATION FORMS*

Item	Frequency	Per cent
Present address	40	100
Date.....	39	98
Marital status.....	39	98
Age and date of birth	37	93
Education.....	37	93
Telephone.....	37	93
Where previously employed	34	85
Signature	33	82
Place of birth	32	80
Work desired	32	80
List dependants	30	75
Height and weight	28	70
Reason for leaving previous jobs	28	70
Relatives in company.....	25	63
Social security number	25	63
Physical impairment.	24	60
Salary on previous jobs	23	57
Citizenship.....	21	53
Employed here before	20	50

* Adapted from *Employment Procedures and Personnel Records*, pp. 22-23, National Industrial Conference Board, Studies in Personnel Policy, No. 38, New York, 1941.

With an application blank, the employment manager can collect a large amount of personal data about each applicant in a fairly easy manner. The manner is so easy, in fact, that he may collect more data than he can use and much more than the applicant wishes to give, for, to the industrial applicant with limited schooling, the filling out of an application blank is a task of considerable proportions. One employment manager hiring young women for unskilled and semiskilled factory work reported the average time required to fill out his application blank to be more than 1 hour and that additional time was needed to check and complete the record since a majority of the applicants

were unable to perform the task correctly. On the whole, however, the applicant can provide reasonably accurate data and with strange patience will even record seemingly irrelevant facts such as the model of his automobile, the birth dates of his six children, or the maiden name of his mother.

EVALUATION OF PERSONAL DATA

Ordinarily the employment manager draws from his own knowledge of living and working conditions to evaluate the various items of information. Often he has the aid of the prospective supervisor, who will state his judgment as to the traits desired in the new employee. As might be expected, the opinions of such experienced judges are often correct and in the long run are probably quite satisfactory. There are many occasions, however, when experience is incomplete, when opinions differ, or when apparent bias exists. Such occasions require a systematic review of personal data with reference to a specific job or general type of employment in order to establish the most effective interpretation of an applicant's personal data.

Various methods have been used in analyzing or validating personal data. All of these methods involve a careful examination of the job performance of a group of employees and of their personal traits at the time of their employment. If it is discovered, for example, that superior welders tend on the average to have completed more years of school than a group of inferior welders, then it can be stated with some confidence that additional schooling is a trait predictive of success at welding. On the other hand, if the facts show that welders with little schooling perform as well as those with greater amounts of schooling, then it is established that this item of personal data is of no value in predicting success. If a number of traits are studied in this way, those that prove to be significant may be assembled to form a composite index of probable success on the job. The method lends itself readily to any degree of statistical refinement that may be warranted by the data or by the practical situation in which the study is made. To illustrate the method, a study will be described below of the traits that characterize successful women steel-mill workers.

ANALYSIS OF PERSONAL DATA—MANUAL OCCUPATION

A large steel manufacturing company during 1943 employed several thousand women for various types of unskilled and semiskilled production and maintenance jobs. These women were employed in positions characterized by relatively heavy physical effort and relatively short training periods. The basis for selection had varied from plant to

plant and from department to department according to the ideas each employer had regarding the characteristics that may lead to good job performance. Some department heads, for example, preferred older women, some younger; some insisted on high-school education while others preferred applicants with lesser education; some gave preference to large, heavy women, while others preferred those of moderate size. A series of studies was undertaken to examine such preferences in order to determine some of the traits that can be shown to be related to job performance. The results in one plant are described here.

The women mill employees of four departments were selected for study. All with more than 3 months' service were rated by their supervisors on the basis of over-all performance on the job. While nearly all were satisfactory in the sense that they were kept in employment, the supervisors identified some (about 43 per cent) who were definitely superior in performance. These were women of the type the supervisor "would like to have more of." Information on a wide variety of personal data items was compiled for this group of 202 women.

Table 141 shows the relationship between some of these items and subsequent job performance. In each instance the percentage of superior employees in each trait range is shown. The traits shown in the table include the five that proved to be significant and one (height) that was not significant in predicting job performance. From this table it is evident that

1. Women with higher mental-ability test scores tend to be superior on the job.
2. Women with higher mechanical-comprehension test scores tend to be superior on the job.
3. Women who are small (below 130 pounds) and those who are large (over 170 pounds) tend to be poor performers, while those in the middle range tend to be superior.
4. The most favorable age range appears to be in the late twenties and early thirties.
5. Women with less than eight grades of schooling tend to be poor performers, while additional schooling beyond the eighth grade appears to be of no special advantage in this type of work.

While these factors individually are uncertain indications of a new employee's probable success on the job, it was thought that the five significant factors in combination would provide a fairly reliable predictive guide for employment interviewers. With this in mind an employment index, found by summing the points of credit allowed for each trait in which the applicant falls within the favorable range (see

Table 141), was calculated for each employee included in the study. The individuals in the favorable range on all five items were found to have 65 chances in 100 of being a superior employee in this type of work, while those with an index of three or less had only 25 chances in 100 of being superior.

TABLE 141.—RELATIONSHIP BETWEEN PERSONAL TRAITS AND PROBABILITY OF
"SUPERIOR" JOB PERFORMANCE
(202 women steel-mill employees)

Trait	Per cent rated "Superior"	Points credit	Trait	Per cent rated "Superior"	Points credit
Age (years):			Height (inches):		
19	33.3	0	61	50.0	None
20-23	47.2	1	62-63	40.0	
24-27	46.0	1	64-65	46.2	
28-31	64.0	1	66-67	43.8	
32-35	44.3	1	68	40.0	
36	44.4	1			
Weight (pounds):			Schooling (years):		
109	36.0	0	7	26.7	0
110-129	40.7	0	8	40.4	1
130-149	57.2	1	9	51.8	1
150-169	52.0	1	10	44.7	1
170-189	20.0	0	11	48.0	1
190	24.0	0	12	47.4	1
Mental test score:			Mechanical com- prehension test score:		
7	32.0	0	5	15.4	0
8-11	42.1	0	6-11	36.4	0
12-15	42.4	0	12-17	40.6	0
16-19	48.2	1	18-23	49.5	1
20-23	62.0	1	24-29	41.7	1
21-27	25.0*	1	30	61.5	1
28	71.5	1			

* Inversion due to small number of cases.

By observing the favorable personal traits established by such a study it is possible to effect an increase in the proportion of superior workers among those to be employed in the future. It is further possible by such a method to avoid the arbitrary acceptance or rejection of applicants on the basis of characteristics that have no demonstrable or logical relationship to job performance.

AN INDEX OF EMPLOYABILITY

The evaluation of personal data in a systematic way can be carried out with reference to any occupation or any group of occupations. An interesting application of the method has been made by Newer,¹ whose object was to predict the employability of public-relief clients.

A survey of opinion among business, industrial, and United States Employment Service personnel workers provided Newer with 16 factors that were commonly believed to be significant in determining a relief client's employability. These factors (see Table 142) were arranged into a convenient scale and were weighted in accordance with the survey of expert opinion, so that a rating, or score, could be calculated for any individual. The scale was then applied in the spring of 1942 to a random sample (206 cases) of the persons seeking relief benefits in January, 1939 at the Onondaga County, New York, Department of Public Welfare. A comparison of the calculated index of employability with the actual number of months of employment that each individual obtained during a subsequent 40-month period showed that the index had a fairly high validity, in that individuals with high indexes tended to secure more frequent or more permanent employment than individuals with low indexes. The coefficient of correlation between the indexes and actual employment was .72.

TABLE 142.—FACTORS USED BY NEWER IN AN INDEX OF EMPLOYABILITY SCALE

Age	Physical defects
Experience	Education
Unemployment	Previous wages
Nationality	Prison record
Dependency	Reason for leaving previous work
Race	Sex
Religion	Personality
Citizenship	Home conditions

As a further check on the value of personal data in predicting an individual's probability of being employed, studies were made of the composition of the personnel still on the relief rolls in January, 1943 and February, 1944. As shown in Table 143, the 1939 clients included a fairly even distribution of employability scores throughout the range, while in 1943 and 1944, as the relief clients were absorbed into the increasingly available jobs, individuals with high indexes disappeared

¹ Newer, Bernard S., *An Employment Expectancy Rating Scale*, Master's Thesis, Syracuse University, Syracuse, New York, 1942. Reported also by Casety, M. A., *An Index of Employability, Occupations*, 1944, **22**, 477-483.

from the relief rolls and the rolls became heavily loaded with low-index individuals.

The author suggests several possible practical applications of such an index of employability: (1) It can be used as a diagnostic aid for the public-relief case worker since an unemployed individual with a high employability index probably is a victim of some personal maladjustment rather than of general economic depression, (2) future acceptance of public-relief clients could possibly be tempered by a knowledge of the applicant's employability in order that the more employable individuals might be kept in competition for the available jobs, and (3) in employment agencies, the acceptance of clients could be based upon an employability index in order to concentrate the agency's efforts on those clients for whom results can be expected with a minimum of cost.

TABLE 143.—COMPARISON OF INDEX OF EMPLOYABILITY SCORES FOR PUBLIC-RELIEF CLIENTS IN 1939, 1943, AND 1944*

Index of employability	January, 1939 (N 206)	January, 1943 (N 741)	February, 1944 (N 163)
85-	10%	0.5%	
75-84	28	25	
65-74	23	5	4%
55-64	23	25	24
45-54	11	33	35
-44	5	34	37
	100%	100%	100%
Total number of clients from which sample was drawn	7,500	1,200	950

* Adapted from Newer.

ANALYSIS OF PERSONAL DATA—SALES OCCUPATION

A number of investigations have been reported dealing with the personal data predictive of success in the sale of insurance. One of these, which illustrates typical methods and results, was carried out by Russell and Cope.¹ An analysis of the records of 500 salesmen resulted in the data of Table 144, from which a score for any applicant can be calculated by summing the chances for success for all items that correspond with the applicant's personal data. The score totals may range from 579, in the case of an individual with all of the less favorable traits, to 732, for one who has all of the more favorable traits.

¹ Russell, W., and Cope, G. V., A Method of Rating the History and Achievement of Applicants for Positions, *Public Personnel Studies*, 1925, 3, 202-219.

The value of such a systematic study of personal data is indicated by the figures in Table 145, which show the percentage distribution of scores for successful as compared with unsuccessful salesmen. None of the successes scored below 640, while a majority scored over 670. In

TABLE 144.—RELATIONSHIP BETWEEN PERSONAL DATA AND SUCCESS OF 500 LIFE INSURANCE SALESMAN*

Item	% chances for success	Item	% chances for success
Age:		Marital status:	
23 years and less.....	49	Married.....	59
24-32.....	58	Single.....	49
33-38.....	64	Club memberships:	
39-44.....	53	1 or less.....	43
45 and over.....	50	2.....	58
Selling experience (life insurance):		3 or 4.....	62
None.....	66	5 or more.....	68
Less than 3 years.....	69	Schooling:	
3-6 years.....	86	15 years and under.....	68
Over 6 years.....	90	16 years and over.....	54
Offices held:		Out of school:	
Less than 3.....	59	9 years or less.....	60
3 or more.....	83	Over 9 years.....	73
Dependents:		Home conditions:	
None or 1.....	49	Rent or board.....	52
2 or more.....	63	Own home.....	63
Number of investments:		Life insurance carried:	
1.....	46	None.....	47
2.....	54	Some.....	59
3 or more.....	74		

* Adapted from Russell and Cope.

TABLE 145.—DISTRIBUTION OF SCORES ON PERSONAL DATA SCALE FOR SUCCESSFUL AND UNSUCCESSFUL INSURANCE SALESMEN*

	579-640	641-670	671-732
Successful salesmen.....	0	24	76
Unsuccessful salesmen.....	31	42	27

* From Russell and Cope.

contrast to this, the failures were distributed quite evenly over the entire range of scores. By eliminating the applicants who scored below 640, this company could have avoided the costly employment of 31 per cent of the failures with a corresponding increase in the average success of those who remain.

An interesting sidelight on this method of evaluating personal data is given by a subsequent study of the salesmen employed by the same firm between 1927 and 1935.¹ Again various personal data items were correlated with actual records. A majority of the items found to be significant in the earlier study were also significant in 1935. Certain items were found to be no longer significant (*viz.*, offices held, number of investments owned, elapsed time since leaving school, and home ownership); some new items were added to the significant list (*viz.*, previous income, previous occupation, minimum living expenses, length of residence in community, and duration of negotiation for employment). The shift in items may be assumed to reflect (a) the introduction of job tenure as an additional factor in determining success, and (b) an actual change in the diagnostic value of items because of elapsed time and changing conditions. These changes illustrate the need for maintaining a continuous appraisal of the factors that are to be considered in employment.

SOME LIMITATIONS OF THIS APPROACH

The three studies reported above are given as examples of an approach to the evaluation of personal data in employment. Many other occupations have been studied in the same way, and, in fact, it is becoming routine practice to include such material in occupational analyses.

It is a frequent protest of supervisors and employment managers that the results of such studies are unrealistic and violate common sense because they establish the validity of only a small number of simple factors and do not deal effectively with the unusual or the complex factors that in the actual employment situation may be of critical importance. It is true that some factors do not lend themselves to statistical study because they occur too infrequently. For example, poor health is rarely *proved* to be a valid reason for rejecting an applicant, because a group of employees being studied rarely includes enough individuals with definite evidences of ill health to establish the point. This, however, does not deny the probability that on certain jobs ill health would be a detriment to performance. Similarly, items that are insignificant alone may in relation to other items assume importance. For example, years of schooling as a separate item may be of no significance; yet when considered in relationship to the applicant's age or family economic background it may be of great significance in that it reflects adherence to popular educational standards and reflects full

¹ *Selecting the Successful Salesman*, The Phoenix Mutual Life Insurance Company, Hartford, Connecticut, 1937.

utilization of one's opportunities. Such considerations make it evident that systematic studies of personal data, while of great value as evidence in employment, do not always convey the complete picture and must in practice be supplemented by nonmathematical evaluations.

EMPLOYMENT TESTS

Employment tests have been in common use for many years among the larger and more progressive business and industrial firms in America. A survey¹ by the National Industrial Conference Board in 1940 of 462 firms revealed that 111 (24 per cent) were using trade tests and 76 (16 per cent) were using intelligence tests in the selection of salaried workers. The same survey showed that, of 40 larger firms, 22 (55 per cent) were using tests for office or factory workers. These surveys are somewhat difficult to interpret because they cover selected firms that are more likely to be advanced in their employment programs, yet it is clear that there is a widespread acceptance of the idea of using employment tests and that, furthermore, there is occurring currently an increase in the scope of their application.

FUNDAMENTAL CONCEPTS OF EMPLOYMENT TESTING

The idea of employment testing is not as new or as strange as many individuals believe. The job tryout is an employment practice of long standing and is in one sense a crude, relatively inaccurate, and costly form of an employment test. Furthermore, the typical employment test is closely related to the interview in that both are a means of observing behavior during a sample period of time in order to predict the later performance of the applicant. The test differs mainly in the fact that it is more closely controlled.

The typical employment test consists of a brief sample of an applicant's performance on a task that is related to the actual job for which he is being considered. By control of the conditions during the test, one may learn in a few minutes what otherwise might take days or even months to learn under conditions of lesser control. There are three fundamental characteristics of an employment test that should be noted. (1) A test is standard, *e.g.*, a printed series of questions to be answered or a standard task to do; the test is thus the same for all applicants. (2) An employment test provides some type of objective record of the applicant's performance. This important feature makes it possible for tests to be used by different examiners and makes it possible to use statistical methods for verifying the value of the tests.

¹ *Employment Procedures and Personnel Records*, p. 38, National Industrial Conference Board, Studies in Personnel Policy, No. 38, New York, 1941.

(3) An employment test provides norms, based upon experience, that permit the interviewer to determine how an applicant compares with other applicants in test performance.

TYPES OF EMPLOYMENT TESTS

The tests used for employment in business and industry are of many kinds to suit the many special needs of various firms and various occupations. In general, the tests fall into three categories—aptitude, achievement, and personality, as described in Chap. IV. These are used as follows:

1. *Tests of Aptitude*—to determine to what extent the applicant has the capacity to learn and to perform the job quickly and efficiently.
2. *Tests of Achievement*—to determine to what extent the applicant has already acquired the knowledge or skills required by the job.
3. *Tests of Personality*—to determine to what extent the applicant is suited for the job in terms of interests, mental health, and capacity for personal adjustment to the working conditions. A few of the tests widely used in employment are indicated in Table 146. Additional information on these tests or on the many other tests available can be secured from other sources.¹

EVALUATING EMPLOYMENT TESTS

The only sure way to determine the value of employment tests for any particular situation is to try them out. Attempts to estimate the value of a test by inspection alone have often been discouraging, and in most situations tests must be checked or validated statistically when they are first installed and periodically during their period of use. The validation procedure includes a number of necessary steps, which may be summarized as follows:

1. Survey the employment problem to determine whether the present employment procedures need improvement.
2. Study the job to determine the critical psychological elements that can be measured by employment tests.

¹ Bennett, G. K., and Cruikshank, R. M., *A Summary of Manual and Mechanical Ability Tests* (Preliminary Form), Psychological Corporation, New York, 1942; Bingham, W. V., *Aptitudes and Aptitude Testing*, Harper & Brothers, New York, 1937; Burt, H. E., *Principles of Employment Psychology*, Harper & Brothers, New York, 1942; *Experience With Employment Tests*, National Industrial Conference Board, Studies in Personnel Policy, No. 32, New York, 1941; Greene, E. B., *Measurements of Human Behavior*, The Odyssey Press, Inc., New York, 1941; Tiffin, Joseph, *Industrial Psychology*, Prentice-Hall, Inc., New York, 1942; Viteles, M. S., *Industrial Psychology*, W. W. Norton & Company, Inc., New York, 1932.

TABLE 146.—SOME TESTS USED IN PERSONNEL SELECTION

Name	Description	Purpose	Source
Otis Self-Administering Test of Mental Ability	A series of multiple choice questions dealing with vocabulary, analogies, opposites, syllogisms, arithmetic problems, etc.	To aid in estimating potential occupational level, learning aptitude, capacity for intellectual work	World Book Company
Thurstone Examination in Typing: Form A	Preparation of typed material from rough copy, preparation of a typed table, and a short spelling test	To measure speed and accuracy in the use of the typewriter	World Book Company
Minnesota Vocational Test for Clerical Workers	Comparison of pairs of numbers and pairs of names for similarity	To measure speed and accuracy in routine clerical work	Psychological Corporation
Bennett Test of Mechanical Comprehension: Form AA	A series of illustrated questions regarding practical mechanical problems	To measure the understanding of basic physical relationships encountered in every day living	Psychological Corporation
Minnesota Rate of Manipulation Test	A board with blocks and round holes; applicant is required to place the blocks in the holes or (alternative use) to turn over the blocks in position	To measure the rapidity of hand and forearm movements	Educational Test Bureau, Inc.
Tweezer Dexterity Test	A small board with holes and metal pins to fit; applicant is required to insert pins in holes using tweezers as tool	To measure speed and accuracy of finger and wrist movements	Human Engineering Laboratory
Bernreuter Personality Inventory	Series of questions regarding the subject's interests and attitudes	To measure the following aspects of personality: neurotic tendency, self-sufficiency, introversion-extroversion, dominance-submission, confidence, sociability	Stanford University Press
Minnesota Multiphasic Personality Inventory	Series of questions regarding the subject's interests, attitudes, experiences and beliefs	To measure the subject's tendency toward certain clinically isolated mental disorders such as paranoia, schizophrenia, hysteria, etc.	University of Minnesota Press
Strong Vocational Interest Blank	Series of questions revealing subject's attitude toward various occupations, school subjects, amusements, activities, peculiarities of people, etc.	To establish a comparison of individual's interests with those of successful persons in specified occupations	Stanford University Press

3. Select or develop some criterion of employee performance that will distinguish better employees from the poorer employees.

4. Choose or develop a series of tests for trial use, including tests covering as many as possible of the psychological factors developed in the job analysis.

5. Give these tests a trial with a representative group of employees in the occupation.

6. Compare the test scores with the job performance of each individual in the experimental group in order to estimate the potential value of each trial test separately and of the tests in various combinations for predicting job performance.

This basic procedure has become standard for the establishment of an appropriate employment-test battery for any occupation, although many minor variations from this procedure are allowed to suit special circumstances.

Some situations do not justify the use of a procedure such as this as, *e.g.*, when the cost or the time loss would be prohibitive, or when the individuals available for trial are too few to permit accurate validation of the tests. As experience grows in the field of employment testing, it becomes increasingly justifiable to make an arbitrary choice of tests for certain occupations. For clerical workers, for example, it is now possible for an experienced employment psychologist to make a satisfactory selection of tests on the basis of a job analysis. Similarly in the selection of personnel for certain types of manipulative work, it is possible to make an arbitrary selection of tests with a high probability of securing beneficial results. Usually, however, the validation procedure is necessary. In the following pages some experiences will be described in which the validation methods have been applied to practical problems in the use of tests for employment.

EMPLOYMENT TESTS FOR CLERICAL OCCUPATIONS

Employment tests are used most widely and most effectively for the clerical occupations. The reasons for this are apparent when one considers the nature of clerical work, which lends itself to experiment with paper and pencil job-sample tests, and when one considers the uniformity of clerical work from one industrial or business firm to another. These factors encouraged early research and permitted the rapid spread of employment testing with a minimum of original research.

Following some preliminary trials with a variety of tests, the following battery was finally adopted for regular use by one large company:

1. A verbal test of mental ability (12 minutes).
2. A clerical test requiring the checking of pairs of names and pairs of numbers for identity (15 minutes).
3. A typing test requiring accuracy and speed in reproduction of copy (10 minutes).
4. A shorthand test scored for the rate at which the applicant can take shorthand notes and the accuracy and speed with which the notes are transcribed (about 20 minutes).

The first two tests were given to all applicants for office employment, while the latter two were given only to applicants claiming to be skilled in typing or shorthand.

After these tests had been in use for some time a study was made of the relationship between the employment test scores and later job performance. As a criterion of actual performance, ratings were

TABLE 147.—RELATIONSHIP BETWEEN EMPLOYMENT TEST SCORES AND PROBABILITY OF "SUPERIOR" PERFORMANCE
(Women clerical workers)

Performance on tests	Per cent of new employees rated "Superior" after 90 days			
	Mental ability test (<i>N</i> 126)	Clerical ability test (<i>N</i> 126)	Typing test (<i>N</i> 92)	Shorthand test (<i>N</i> 48)
Applicants in upper third on test	77	57	90	87
Applicants in middle third on test	38	50	31	82
Applicants in lower third on test	24	31	27	47

obtained from the supervisor after the employee's first 90 days of service; these ratings reflected the performance, ability, cooperation, and initiative of the new employee and are known to have a reliability of approximately .80. For this analysis, the employees were divided into upper, lower and middle thirds according to their test scores; and the percentage of employees receiving "average," "above average," and "superior" ratings were calculated for each group. Table 147 presents the results. The first column, titled "Mental Ability Test," shows that the percentage of "superior" employees decreased from 77 per cent among the high-scoring applicants to 24 per cent among the low-scoring applicants. The clerical test also proved to be somewhat effective, the percentages being 57, 50, and 31. In the third column is shown the relationship between the typing-test scores and the super-

visory ratings. In this case, the table represents only those new employees who were employed for positions requiring typing skill. Of those whose typing scores were in the upper third, 90 per cent proved to be "superior" employees while those scoring in the lower third produced only 27 per cent "superior" ratings. The shorthand-test scores show similar results. The effectiveness of the four tests in combination for employing stenographers is indicated by a correlation coefficient of .71 between the combined ratings on four tests and subsequent supervisory evaluations.

It was concluded from this study that the tests originally selected were actually functioning in this type employment situation and that they provided a convenient and useful aid in the selection of better clerical workers.

EMPLOYMENT TESTS FOR MECHANICAL OCCUPATIONS

A large percentage of the employed people of America are engaged in work of a manipulative or mechanical nature. It is not surprising, therefore, that a great amount of research has been carried out on the use of employment tests for the placement of people in those occupations. One such study was made by Bennett and Fear¹ on the selection of machine tool operators.

A group of 40 experienced operators, some known to be excellent operators, others known to be relatively incompetent, were given the five tests listed below:

1. Revised Beta. (A paper and pencil, nonlanguage test of mental ability.)
2. Mechanical Comprehension Test (see Table 146).
3. Two-hand Coordination Test. (A test requiring coordinated operation of two screw mechanisms.)
4. A Hand-eye Coordination Test. (A test requiring the following of a moving target with a small pointed instrument.)
5. Hand-tool Dexterity Test. (A test requiring use of common tools to disassemble and assemble nuts and bolts.)

The check with 40 operators showed that all five tests served to identify the better as compared with the poorer operators. However, an analysis of the results showed further that two of the tests in combination, namely, tests 2 and 5, would be most effective, and these two were given to all machine tool operators employed during subsequent months.

¹ Bennett, G. K., and Fear, R. A., *Mechanical Comprehension and Dexterity, Person. J.*, 1943, 22, 12-17.

About twelve months after this program had been initiated, ratings were obtained of the performance of the new workers. According to these ratings some employees were considered excellent on the job, some good, others average, below average, or poor. The percentage of individuals, divided according to their employment test scores within each of these rating categories, is shown in Table 148. This demonstration of the close relationships between test scores and actual performance resulted in the acceptance for subsequent employment of only those applicants who scored A and B on the tests.

TABLE 148.—RELATIONSHIP BETWEEN PERFORMANCE RATINGS AND EMPLOYMENT TEST SCORES FOR MACHINE-TOOL OPERATORS

Rated performance	Combined ratings on mechanical comprehension and dexterity tests				
	A, per cent	B, per cent	C, per cent	D, per cent	Total per cent
Excellent on job	50	41	9	0	100
Good on job.....	31	44	21	4	100
Average on job.....	18	36	36	10	100
Below average on job.....	0	43	19	38	100
Poor on job	0	25	25	50	100

EMPLOYMENT TESTS FOR UNSKILLED WORKERS

The nature of American industry is such that the unskilled, routine, manipulative jobs tend to predominate over others. It is significant, therefore, that psychological testing methods have also contributed substantially to the improvement of selection for this type of work. Representative of experiments in this field are those reported by Cook.¹ Table 149 summarizes the results obtained through experiments on two occupational groups, coil winders and solderers.

The first portion of the table shows the relationship between scores on a special coil winder's test to the actual performance of a group of 113 coil winders as evidenced by their incentive earnings. The job in this case consisted of winding fine wire around a core, inserting insulators, splicing wires, and attaching leads. The test designed for this occupation consisted of a semicircular double row of pegs on which the applicant was required to wind a cord in a predetermined pattern. When a time score established by experience was taken as the dividing mark between passing and failing employees on this test, it was found

¹ Cook, D. W., *Psychological Tests for Unskilled Jobs*, pp. 18-29, American Management Association, Personnel Series, No. 50, New York, 1941.

that 92 per cent of the high-earning group passed the test, while 8 per cent failed. In contrast to this, of the lower earning group 28 per cent passed and 72 per cent failed. The advantage to the company in employing applicants scoring above the critical mark is evident.

In the case of solderers somewhat similar results were found. In this job girls were required to attach colored wires to terminals according to a simple print, cut off excess wire, and then solder. Three tests proved to be of value in employment for this occupation: the Otis S-A Test of Mental Ability, a Monotony Test in which the subject is required to tap a stylus through a series of small holes without touching the metal rim of the holes, and a Finger Dexterity Test in which small metal pegs are placed rapidly into a series of holes in a wood block. It

TABLE 149.—RELATIONSHIP BETWEEN EMPLOYMENT TEST SCORES AND PERFORMANCE ON UNSKILLED JOBS

A. Coil Winders (Special Job-sample Test)

	Per cent failing test	Per cent passing test	Total, per cent
High-earning group.....	8	92	100
Low-earning group.....	72	28	100

B. Solderers (Otis, Monotony, and Finger Dexterity Tests)

	Per cent below average performance	Per cent above average performance	Total, per cent
Above average on tests.....	18	82	100
Below average on tests.....	100	00	100

will be seen from the table that girls above average on the three tests, with very few exceptions, were considered to be above average in job efficiency, whereas those scoring below average on the combined tests, without exception, were considered to be below average in job performance.

EMPLOYMENT TESTS FOR TECHNICAL OCCUPATIONS

Ordinarily a person who has received extensive training or experience in one of the technical or professional occupations has given so much time and energy in this training that his entry into some other field can hardly be considered. Furthermore, the problem of survival during a competitive intensive training period tends to eliminate persons who lack adequate capacities in the field. Nevertheless, several

firms have found it possible and worthwhile to establish batteries of tests for use in the employment of technical personnel.

One such study has been made by a large company in connection with the employment of industrial engineers and assistants, for miscellaneous duties that included the making of time and motion studies, analysis of production data, and the analysis of production and control procedures. A group of 66 individuals engaged in this work were given a trial series of nine tests. This series included tests of mental ability, clerical aptitude, elementary arithmetic, mechanical comprehension, practical judgment, and a personality questionnaire. The experimental group was selected from a larger group of men so as to include representative "good" engineers and representative "poor" engineers according to the supervisor's judgment.

Analysis indicated that three of the tests in combination would provide a significant index for use in future employment. These three tests were those for mental ability, arithmetic, and mechanical comprehension. When these three tests were combined into a single predictive index the results shown in Table 150 were found. The first group represents 20 men scoring $+ .5$ or higher on the combined tests. In this group 90 per cent were "good" employees, 10 per cent were relatively "poor." At the other extreme were 12 men scoring below $- .5$ on the combined tests. In this group 17 per cent were considered "good" employees, 83 per cent were considered "poor." It is evident that the company, by rejecting applicants scoring below $- .5$ can thereby eliminate men who are very likely to be "poor" engineers.

TABLE 150.—RELATIONSHIP BETWEEN PERFORMANCE RATINGS AND PERFORMANCE ON EMPLOYMENT TESTS
(66 industrial engineers and assistants)

Combined score on 3 tests	Per cent rated "Poor"	Per cent rated "Good"
$+ .5$ or higher (<i>N</i> 20).	10	90
$.0$ to $+ .5$ (<i>N</i> 18)	44	56
$- .5$ to $.0$ (<i>N</i> 15)	47	55
$- .5$ or lower (<i>N</i> 12)	83	17

SUMMARY

The psychological factors in employment are considered to be significant because of (1) the economic advantages to be gained through proper matching of job requirements and employee abilities, and (2) the social and personal advantages to be gained through the job security and job satisfaction that accompany proper placement. Data

on individual differences in productivity, on turnover rates, and employment rates suggest that the problem is one of great scope and importance.

In the typical employment situation three primary sources of evidence are used in determining an applicant's fitness for a given position. These are (1) an interview, (2) a record of personal data, and (3) employment tests. The purpose of this chapter has been to discuss methods used to check the utility of these employment aids and to discuss some representative studies in each area.

Studies of the employment interview suggest that the average interviewer falls far short of perfection in his appraisal of applicants yet is able to predict an applicant's probable success with a significant degree of accuracy. Standardized procedures in conducting the interview, in recording the interview, and in evaluating the content appear to produce worthwhile gains in the reliability and validity of the interview. Interviewers vary greatly in their competence, primarily for want of systematic training in the interviewing skills.

In checking the value of personal data as evidence in employment it appears that, for many occupations, certain objective facts about an applicant's physical, educational, social, and economic history may be of definite value in differentiating the better applicants from the poorer ones. These items vary from one occupation to another; they may vary from time to time; they are not easily identified without the use of a statistical evaluation of past experience. Factors can be identified that predict, not only general employability, but also an individual's probable success on any specific job.

Tests as an aid to employment are used on a small scale relative to their potential application, yet they have a firm acceptance among the more enterprising organizations. Their applicability to nearly all types of occupations has been verified beyond serious question.

The scientific methods for studying the psychology of employment are used by business and industry for the purpose of economy. They are used mainly because they lead to reduced cost in hiring, training, supervising, and producing. The employment aids discussed in this chapter do not provide for the perfect placement of new employees but are expected when used in combination, each supplementing the others, to effect an improvement over the results achieved without systematic study.

RECOMMENDED SUPPLEMENTARY READINGS

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CHAPTER XIV

PSYCHOLOGY IN INDUSTRY—TRAINING AND MERIT RATING¹

Training

- A Job Instruction Plan

- Some Psychological Principles in Job Instruction

- Selecting a Training Unit

- Transfer of Training

- Motivating the Learner

- Interference

- Emotion

- Comprehension versus Drill

- Retraining Experienced Employees

Merit Rating

- Objectives of a Formal Rating Program

- Continuity of Judgment

- Improvement of Accuracy of Evaluations

- Fairness to Employees

- Improvement of Employee Performance

- Guidance in Personnel Changes

- Merit-rating Procedures

- Rank-order Ratings

- Scale Ratings

- Check-list Ratings

- Narrative Comment

- Accuracy of Merit Ratings

- Reliability of Ratings

- Validity of Ratings

- Related Personnel Problems

The principles of psychology have been applied to the personnel problems of business and industry, just as they have been applied to human affairs in other fields. In recent decades, as the understanding of behavior has increased, the ability to apply these principles has likewise increased; and systematic efforts have been made to develop a body of knowledge and a record of experience enabling the better utilization of human behavior characteristics in the management of business and industry.

Of the many personnel problems confronting the manager of a firm,

¹ This chapter was written by Stanley E. Seashore, of McKinsey, Kearney & Company, Chicago, Ill.

the training of employees to perform their work is one of the most prominent. In a typical firm, the major item of expense is the amount paid for the services of employees, and it is therefore apparent that a successful enterprise must have employees who are able to do the work efficiently. In addition, the training of business and industrial personnel is a constant problem. In Chap. XIII data were given on the number of individuals making job changes in American business and industry in a typical year; each of these job changes represents a training problem, because new skills or work methods must be learned. Each time an employee is transferred or promoted and each time a firm introduces new products or new methods, it is necessary to train the personnel affected. A part of this chapter will therefore be given to a discussion of business and industrial training.

Related to the training of employees is the problem of evaluating their performance, their suitability for promotion, their qualifications for special training, and their other significant characteristics. Any firm to operate effectively must have some means for determining the potentialities and limitations of each employee and for planning the effective utilization of each employee. This need has led to the development of the merit-rating techniques that will be discussed in the latter part of this chapter.

TRAINING

Systematic training for business and industrial personnel is given in a variety of forms to correspond with the variety of occupational demands characteristic of our time. The oldest and most commonly recognized training system is the apprenticeship plan, in which a complex trade is taught over a period of several years, during which the trainees serve as helpers to tradesmen, receive instruction, and gradually gain experience in increasingly difficult phases of their trade. Bricklayers, machinists, painters, pipefitters, and carpenters are among those who normally learn their trade through an apprentice program.

In addition to apprentice programs, a variety of other types of training programs have been developed. Learner training, for example, has been widely practiced in recent years, such programs usually being similar to apprenticeship but of shorter duration and providing a more limited range of skill and knowledge. In vestibule training specific job skills and related information are taught in a shop or school set apart from the regular working place; new employees are trained briefly before being introduced to the actual job. Many firms arrange courses, usually called "vocational" or "extension" courses, in subjects related to the work done by the firm so that employees may

voluntarily prepare themselves for advancement. In addition, special supervisory training is often offered. This training usually takes the form of periodic classes or conferences for new and experienced supervisors, to inform them of company policies and procedures and to give instruction in the various phases of supervision. A detailed discussion of these and other types of training is given by Dodd and Rice.¹

In all of the above types of training, the purpose is to impart a more or less extensive group of related skills or items of knowledge. They differ in the nature of the instruction given and the manner in which the material is organized, but in all cases there is an essential similarity. This similarity lies in the fact that each training program is compounded of many smaller units of instruction that, if they are to be taught effectively, must be taught in a manner consistent with known principles common to all learning. An electrician apprentice, for example, must learn the large number of specific items (tasks or jobs) required for his trade. Similarly a new supervisor or clerical worker must learn specific jobs no more mysterious or vague than those making up the electrician's trade. The problem in business and industrial training is to apply sound psychological principles to each item of job instruction.

A JOB INSTRUCTION PLAN

One of the most simple and practical presentations of sound instruction method is embodied in the Job Instructor Training Program developed in the early months of the Second World War by the Training Within Industry branch of the War Manpower Commission.² This program, popularly called "JIT," was presented to assist supervisors and other persons responsible for wartime training to carry out their task with a minimum of waste time and effort. Under this program, many thousands of persons were given a 10-hour course in how to give job instruction.

The success of this program is evident from the speed and ease with which persons with little or no industrial experience were drawn into war-production activities and contributed to the most intensive production program the world has known. The JIT program was successful because it provided for the application of psychological principles to the problem of how to teach a man to do a job. The

¹ Dodd, A. E., and Rice, J. O. (Eds.), *How to Train Workers for War Industries*, Harper & Brothers, New York, 1942.

² War Manpower Commission, *Job Instruction Training Manual*, U.S. Government Printing Office, Washington, 1942.

<p><i>How to Get Ready to Instruct</i> <i>Have a Time Table—</i> how much skill you expect him to have, and how soon.</p> <p><i>Break Down the Job—</i> list principal steps. pick out the key points.</p> <p><i>Have Everything Ready—</i> the right equipment, materials, and supplies.</p> <p><i>Have the Work Place Properly Arranged</i> just as the worker will be expected to keep it.</p>	<p><i>How to Instruct</i> Step 1—<i>Prepare the Worker</i> Put him at ease. Find out what he already knows about the job. Get him interested in learning job. Place in correct position.</p> <p>Step 2—<i>Present the Operation</i> Tell, Show, Illustrate, and Question carefully and patiently. Stress key points. Instruct clearly and completely, taking up one point at a time—but no more than he can master.</p> <p>Step 3—<i>Try Out Performance</i> Test him by having him perform the job. Have him TELL and SHOW you; have him explain key points. Ask questions and correct errors. Continue until you know HE knows.</p> <p>Step 4—<i>Follow Up</i> Put him on his own. Designate to whom he goes for help. Check frequently. Encourage questions. Get him to look for key points as he progresses. Taper off extra coaching and close follow-up.</p>
<p><i>Job Instructor Training</i> WAR MANPOWER COMMISSION Bureau of Training Training Within Industry KEEP THIS CARD HANDY</p>	
<p>IF WORKER HASN'T LEARNED, THE INSTRUCTOR HASN'T TAUGHT</p>	

FIG. 50.—War Manpower Commission Job Instructor Reminder Card.

following pages present some of these principles and discuss their application.

SOME PSYCHOLOGICAL PRINCIPLES IN JOB INSTRUCTION

The basic ideas in the JIT program are simple enough to allow summarization on the small pocket-size card shown in Fig. 50. The front of this card presents the things to consider in preparation for the actual instruction, and the reverse presents the four steps that normally ensure quick and thorough learning. Although the steps are phrased with reference to a manual job, it has been found that the same ideas can be adapted to any of the common occupations.

Selecting a Training Unit.—The first problem in teaching a man to do a job is the selection of a unit of training that is psychologically appropriate. For example, in teaching a person to operate an automobile, one might teach the entire task including starting the motor, engaging the gears, steering, control of speed, reversing, parking, observation of driving conventions, and so on, all as a single operation. An alternative method would be to impart a mastery of each step before combining them. A third possibility, the method considered most effective, would be to teach a minimum of each step and then to perfect them together as a single job unit under actual driving conditions. It is known, for many jobs, that proper selection of the unit of training will greatly facilitate learning.

The JIT plan requires that a job breakdown be made as a guide to the selection of a training unit. Figure 51 shows a typical breakdown for a milling machine operation, Part A being a breakdown for a mill dovetail, Part B being an elaboration of one step (Step 4) in this operation. Such a breakdown not only provides a guide for the instructor, but it enables the selection of functional units that may be isolated for training purposes and enables the combining of those smaller units into larger units. In the absence of a clear definition of the steps to be taught either in written form, as a job breakdown, or in the mind of a skilled instructor, there often occurs an illogical sequence of training or the inclusion of irrelevant matters that tend to complicate and interfere with the learning process.

One problem that deserves attention in preparing a job breakdown and in selecting a suitable training unit is ensuring that any given series of steps, if taught separately, are the same alone as they would be in the normal work sequence. The applicable principle appears to be that the best training units are the smallest units that can be isolated without thereby changing their character or losing their integration with preceding, following, or otherwise related units. This matter, as

Part	Slide Base 235310	Operation	Mill Dovetail
Important steps in the operation		Key Points—knacks, hazards, "feel," timing, special information	
1. Select cutter		Small—minimize chatter	
2. Select holder parallels		Narrow—yet to give good hold	
3. Place piece in vise		Check with tissue	
4. Rough cut		Start by hand—1"—Check for finish stock and location	
5. Trial finish cut		Check—make correction	
6. Finish cut		Finish without stopping	
7. Remove from vise			
8. File burrs			
9. Check			

An experienced workman in a machine shop made this breakdown in six minutes. This instructor uses this breakdown "as is" for workers who have had other milling machine experience. For green men each of these steps might constitute an "instructing unit" by itself and require a separate detail breakdown. Figure 51-B shows the detailed breakdown for Step 4, above, Rough cut.

FIG. 51A.—Job breakdown sheet for training man on new job.

Part	Slide Base 235310	Operation	Rough cut for Milling Dovetail
Important steps in the operation		Key Points—knacks, hazards, "feel," timing, special information	
1. Run up table by hand		Slow when nearing cutters	
2. Feed 1" by hand			
3. Stop machine and run back table		Never run table back while cutters are in use	
4. Check cut		Location and finish	
5. Set feed			
6. Start machine			
7. Finish cut			
8. Check			

FIG. 51B.—Job breakdown sheet for training man on new job.

well as other aspects of the selection of the training unit, is discussed in some detail by Viteles.¹

Transfer of Training.—In Chap. IV, a discussion of transfer of training was given with reference to formal education and the general

¹ Viteles, M. S., *Industrial Psychology*, pp. 317-342, W. W. Norton & Company, Inc., New York, 1932.

conclusion drawn that transfer appears to occur mainly when there are identical elements in the learning and performing situations. The JIT program accordingly emphasizes that training should be given in a place, and with equipment, as similar as possible to the actual working situation.

One recent study by Woodward¹ made in this connection illustrates the relatively little transfer that may occur in the learning of a motor task. For this experiment two similar groups of trainees were taught to perform a simple assembly task. The control group received an original standard period of training followed after a lapse of time by a standard final period of training. The experimental group received similar training on the first task, assembly of a loom, plus an interven-

TABLE 151.—TRANSFER OF TRAINING IN AN ASSEMBLY TASK

Trials (in groups of three)	Mean score control group	Mean score experimental group	Difference	Critical ratio
First.....	360.6	348.2	12.4	1.77
Second.....	324.6	317.1	7.5	1.25
Third.....	308.3	294.3	14.0	2.74
Fourth.....	295.2	281.2	14.0	2.86

ing period of training on a second task that was superficially different but essentially the same as the original task. The results shown in Table 151 indicate that the intervening practice on the similar task resulted in a small, but statistically insignificant, advantage for the experimental group over the control group. This difference, occurring under conditions highly conducive to transfer of training, amounted in practical terms to a maximum advantage of about 5 per cent, and there is reason to believe that even this advantage would have disappeared had the experiment been continued for a longer period. This experiment appears to demonstrate that transfer of training may occur for manual tasks under certain favorable circumstances but that this transfer is probably of little real value compared with the improvement shown by direct training on the task to be learned.

It is common knowledge in industry that any new or transferred employee must receive training, no matter how extensive his former experience and no matter how similar his former and new jobs may seem. It is even true that a man being transferred from one lathe to another must learn the special features of the new machine and the knacks required to use it most effectively. The JIT plan is therefore

¹ Woodward, Patricia, *An Experimental Study of Transfer of Training in Motor Learning*, *J. Appl. Psychol.*, 1943, 27, 12-32.

psychologically sound in its provision for training *on the job* whenever possible.

Even though each job is to some extent unlike all others, there are many jobs or groups of jobs having elements in common that permit a person trained in one to adapt his knowledge and skill easily to another. These job families (see Chap. V) are now being identified by means of comparative job descriptions in order that persons who must change their work may select new jobs that will utilize their former training. A recent publication of the War Manpower Commission¹ illustrates the application of this idea with respect to the transfer of military training to peacetime civilian occupations. Table 152 presents an example of one naval occupation, Boatswain's Mate, Second Class, for which such transfer of training may be utilized. It should be noted, however, that additional training is specified to qualify the Boatswain's Mate for each of the related occupations.

Motivating the Learning.—Step 1 in the JIT plan properly emphasizes the need to get the learner interested in learning the job. This is based on the psychological principle mentioned in Chap. IV to the effect that the amount and speed of learning depends in part upon the trainee's intention and active desire to learn. Most new business and industrial workers have their chief incentive in the fact that they must learn to do their work in order to keep their jobs. This financial incentive is often refined as an aid in industrial training by having the amount of pay increased in accordance with the progress made in training, or by having a beginner's rate of pay, lower than the regular rate, which the trainee must accept until he has learned enough to meet the performance standard of experienced workers. While the financial incentive is not the only source of motivation and while it is not always the most effective motivation, it is one that is widely recognized and relatively easy to use.

Among the other sources of motivation for trainees that have been shown to be effective are the knowledge of a definite goal to be achieved and the knowledge of the usefulness of the task being learned. The JIT plan recognizes these, first, by providing a previously determined schedule for learning that the trainee is challenged to meet and, second, by providing at the beginning of the training period an explanation of the purpose of the task, its importance, and its place in the over-all function of the firm.

A typical experiment illustrating another type of motivation was

¹ War Manpower Commission, *Special Aids for Placing Navy Personnel in Civilian Jobs*, U.S. Government Printing Office, Washington, 1943.

TABLE 152.—QUALIFICATIONS AND RELATED CIVILIAN OCCUPATIONS FOR BOAT-SWAIN'S MATE, SECOND CLASS*
Qualifications

Navigation—Be a qualified steersman and coxswain of a power boat and know the duties and safety precautions to be observed; know how to stand competent watch at various stations; know the rules of the road for lights, fog signals and right-of-way; know signals for distress and warning; know cause of compass errors and be able to set up and read a boat compass and lay a course on a harbor chart; know United States buoyage system; know how to handle boats through surf and carry out an anchor.

Signalling—Know international code flags and pennants and be able to send and receive messages in semaphore.

Canvas Working—Know how to patch and seam canvas; know kinds of canvas, purpose of each, and how to store wet, painted or oil-coated canvas; know how to make simple canvas articles such as hatch hood, boat cover or sail bag.

Rope, Wire, Block and Tackle Work—Know how to make seaman's knots, splice wire and rope, and make a boat fender; know parts and uses of blocks and tackles, and how anchor chain is made up, marked and controlled; know how to reeve off a set of boat falls and a guss warp, how to hoist boats, aircraft and heavy weights in own ship, and how to overhaul and clean anchor chain.

Selected related civilian occupations	Job code†	Additional training required
Rigger II.	6-27.813	No specific technical training necessary other than brief on-the-job training in particular job requirements.
Cable Splicer I	7-89.051	
Rope splicer	7-89.061	
Deckhand I.	9-48.10	
Sewer, Hand I	6-27.078	Brief additional training in particular type of stitching used for awnings, parachutes, or other heavy fabric materials.
Awning Maker	6-27.811	
Parachute Repairman . .	7-49.023	Training in deck service of a ship such as steering, making minor repairs, making depth soundings, stowing cargoes, elementary navigation, and how to rig a ship for towing.
Sailor I.	2-68.20	
Able Seaman	7-48.020	
Ordinary Seaman	7-48.040	
Cadet, Deck	7-48.050	Training in operation of particular type of winch (steam or electric) and type of work to be performed such as pile driving, dredging, or loading; and making minor repairs.
Winchman, Pile Driving. .	7-23.610	
Boat Loader	7-47.300	
Crane Operator, Portable. .	7-73.010	
Winchman, Steam.	7-73.710	
Winchman, Cargo	7-73.730	

* Adapted from War Manpower Commission, *Special Aids for Placing Navy Personnel in Civilian Jobs*, p. 19, U.S. Government Printing Office, Washington, 1943.

† U.S. Employment Office Job Code.

carried out by Ross.¹ In this instance, students were allowed practice on a simple task of penciling short lines, four vertically and one diagonally, as rapidly as possible. Three groups were selected on the basis

¹ Ross, C. C., An Experiment in Motivation, *J. Educ. Psychol.*, 1927, 18, 337-349.

of equivalent average initial performance and then 10 practice, or learning, periods were allowed each group. Group 1 were informed of their progress daily, group 2 were given partial information, and group 3 were given no information about their progress. At the end of the experiment the three groups, formerly equal, had average corrected scores of 57.4, 54.3 and 53.2, respectively. Apparently the simple device of informing trainees of their progress serves in some circumstances as a definite motivating factor for efficient learning.

Interference.—One of the most striking features in learning a new task is the ease with which improper work methods may be acquired and the difficulty experienced replacing them with correct work methods. Once learned, a routine task may become so automatic that a positive effort to unlearn a method must be made before a better method can be substituted. This interference or negative transfer of training can be avoided only by learning the task correctly in the first instance.

Any person who has learned to operate a typewriter using visual rather than kinesthetic senses to locate keys and who has then undertaken to learn the touch system is aware of the interference encountered in learning the newer work method. In industry also, learning periods are often prolonged unnecessarily by a change of work method during the training. Gilbreth¹ was among the first to observe this as a result of his detailed study of the bricklayers trade. He found that bricklayer trainees originally instructed at a slow pace were required to learn a different set of motions when the pace was increased to normal working speed. Not only was the original instruction largely wasted, but it retarded the speed of later learning in the correct method.

Steps 2 and 3 of the JIT plan, emphasizing systematic, step-by-step demonstration, description, and practice and also the preparation of the job breakdown, are intended to ensure that the trainee has no opportunity to learn inefficient or unsafe methods. In addition, the JIT plan places responsibility for training in the hands of one person rather than several persons, thereby preventing the new worker from receiving contradictory instruction in work methods from instructors who may have developed individual knacks that are not standard.

Emotion.—The emotional state of the learner is known to be an important factor in facilitating or retarding the learning process. In general, moderate excitement such as that arising from high degrees of interest or motivation appears to aid learning. On the other hand,

¹ Gilbreth, F. B., *Motion Study*, p. 116, D. Van Nostrand Company, Inc., New York, 1911.

excess emotionality tends to distract the learner, reduce attention, and inhibit learning.

This is a matter of importance in industrial training, because much of the training is given under conditions that are likely to be unfavorable. A new or transferred employee usually feels strongly the stress of being in a new and strange situation. He often has just been through the confusing details of an employment procedure and is often more concerned with getting to know his new supervisor and the men with whom he is to work than he is in learning his new job. It is proper, therefore, that the first phase of Step 1 in the JIT plan is "put the learner at ease."

TABLE 153.—PROGRESS OF PLANER OPERATOR TRAINEES DURING SUCCESSIVE TWO-WEEK PERIODS

Period of training	Per cent improvement over mean performance during initial period		
	Operator 1	Operator 2	Operator 3
Initial period			
Second period.	37.0	49.0	29.5
Third period.	6.6	6.0	5.4
Fourth period	11.3	10.3	5.4
Fifth period	9.4	5.3	1.0

Comprehension vs. Drill.—Some psychologists¹ distinguish between thoughtful learning, or comprehension, and blind learning based on repeated practice. The difference can be illustrated by the learning curve for a typical industrial task that involves both comprehension and motor skill. Table 153 shows the learning progress of three green planer operators who were learning to perform a standard operation on steel armor plate. All three individuals show the poor initial performance characteristic of new workers, followed by a rapid improvement while thoughtful learning is taking place, and then a period of slower improvement based upon the perfection of manual skills and individual knacks.

It is believed that a majority of business and industrial jobs are being simplified and made repetitive to such a point that comprehension can be imparted during an initial formal training period, with subsequent slower improvement in performance being achieved by practice on the job. This characteristic of a growing majority of

¹ Pear, T. H., *Skill in Work and Play*, Methuen & Co., Ltd., London, 1924; Cox, J. W., *Manual Skill*, Cambridge University Press, London, 1934.

jobs emphasizes the advantage of systematic training for comprehension, and correspondingly it de-emphasizes the role of extended practice in the development of skill. The comprehension of a job is the aspect of skill that most easily and most profitably can be influenced by systematic training methods. The JIT plan is therefore psychologically sound in requiring careful *explanation* of the job to the trainee, *demonstration* of how it is performed, and finally a *verification* of the trainee's comprehension by requiring him to perform the task early in the training process and to explain it verbally to the instructor.

(RETRAINING FOR EXPERIENCED EMPLOYEES

While the value and necessity of systematic training for new employees is apparent it is often surprising to observe the results that can be obtained from the retraining of experienced workers. It would appear that the best of initial training does not guarantee optimum performance nor does it prevent the later acquisition of inefficient, unsafe, or costly working methods.

TABLE 154.—IMPROVEMENT IN PERFORMANCE OF OPEN-HEARTH FURNACE CREWS DURING A RETRAINING PROGRAM

Five-week Periods		Net Tons Per Furnace Per Operating Hour
Before retraining.	.....	11 82
Second period	.....	12 40
Third period	.....	12 72
Fourth period	.....	12.92
Total improvement	.....	9.4%

Table 154 illustrates the improvement in performance resulting from the retraining of experienced crews operating open-hearth steel furnaces. When selected superior crew members were trained in job instruction methods and assigned to give individual instruction to each of the other crew members, the result was an increase in average output for the furnaces, a decrease in fuel consumption, and a related decrease in operating delays or interruptions of work due to mechanical failure. For this open-hearth department, during the fourth period, nearly 3,000 additional tons of steel were produced per week as compared with the average production before the institution of the retraining program.

During recent years many firms have established programs for periodic retraining of certain employee groups in recognition of this tendency for men in some circumstances to experience a loss of skill even though regularly engaged in the work.

MERIT RATING

A business or industrial firm is made up of people. These people all have their personal fortunes and their collective welfare bound to the welfare of the organization of which they are a vital part, and, in addition, the status of the firm is usually dependent in large part upon the effectiveness of its members. For these reasons it is important that provision be made for the evaluation of each member's contribution to the firm and for the adjustment of each individual's status so as to encourage the maximum contribution by each member. This requires the evaluation of individual performance and capabilities.

While the idea of formal employee merit rating is sometimes considered a controversial one, it nevertheless is generally recognized that some type of employee evaluation is necessary. During recent years in which the employer's freedom of action in dealing with the employee has been curtailed, especially through the principle of job rights based on seniority, it has become even more important than before to a firm to be able to detect unqualified personnel as early as possible during the probationary or trial period of employment and to make optimum use of its permanent personnel. Many firms accordingly have replaced their former informal methods with procedures for the systematic evaluation of the characteristics of their employees.

A recent survey of 64 selected larger employers revealed that formal merit rating was used by approximately one-third of such companies.¹ In addition to this evidence that the larger, more progressive companies are actually using formal merit-rating methods, it is evident from the increasing number of articles in technical journals on this subject that it is a matter of interest and concern to business and industry.

OBJECTIVES OF MERIT-RATING PROGRAMS

The advantages of using a formal employee-rating plan can perhaps be most clearly illustrated by outlining several typical situations in which such ratings can be used.

An employee is given a raise. Another employee comes in afterward and claims to be as good as, or better than, the one who got the raise. His story is so convincing that it is next to impossible to give him any real factual comparison between himself and the other man. Of course, he is sent out with "no" for an answer, but, the chances are, with a feeling of discrimination deeply embedded in his mind.

An employee with several years' service is picked for lay-off. When he is

¹ Starr, R. B., and Greenly, R. J., Merit Rating Survey Findings, *Person. J.*, 1939, 17, 378-384.

notified, he asks why it took five years to find out he was incompetent, and why he was not told three or four years before that he was slipping so that he could have improved his performance. What sound, legitimate and fair answer can be given him?

After lay-offs have progressed to the point where most of the employees left are perfectly satisfactory, management faces the necessity of making still further lay-offs. How many executives have not been "stumped" to know how to pick the next group?¹

It is situations such as these that lead employees and also the managers of a firm to concede that fairness, convenience, and efficiency require the development and continuous maintenance of the best possible appraisals of employees.

Continuity of Judgment.—One of the main reasons for having a formal merit-rating program is to provide for a continuity of evaluations in situations where individuals and conditions change. In a typical organization, supervisors and other personnel are transferred and promoted at more or less regular intervals with the result that an employee may serve under a number of different supervisors in the course of his employment. In the absence of a merit-rating program; each new supervisor must formulate an opinion of the worker during the course of these first weeks of contact. This is difficult for the new supervisor, who may be called upon to make personnel changes before having full opportunity for observation; and, in addition, it is sometimes unfair to the employee, whose status should perhaps rest upon his performance over a period of time rather than upon his performance during the first weeks under a new supervisor. In addition, in times of stress such as those recently experienced in war production and postwar reconversion, the rapid shifting of supervisors and workers often results in a complete loss of the knowledge developed through long contact between supervisor and subordinates; quite often, no one remains who is in a position to make proper decisions with respect to work assignments, promotions, transfers, and so on. One of the main objectives of merit rating, therefore, is to ensure the continuous maintenance of a record of each employee so that there will be no interruption with respect to the firm's awareness of individual capabilities.

Improving the Accuracy of Evaluations.—A second important purpose of a merit-rating program is to ensure that the evaluations made by supervisors are more comprehensive and accurate than those likely to be obtained in the absence of a systematic rating program. For this reason, most rating programs provide some type of rating form

¹ Conover, William, quoted in *Employee Rating*, p. 4, National Industrial Conference Board, Studies in Personnel Policy, No. 39, New York, 1942.

that encourages the supervisor to consider all important aspects of his subordinates' performance and capabilities and assists him in avoiding biased or partial evaluations. The appraisal of an individual in accordance with a standard procedure ensures the securing of more complete and more accurate information.

In addition, merit-rating procedures are often established for the purpose of developing uniform standards insofar as this can be accomplished. In a large organization, it is apparent that an employee considered superior by one supervisor may be considered average or even below average by another supervisor, depending upon the basis used for judgment. A sound merit-rating program is usually set up in such a way as to encourage the development of common standards of value so that an appraisal made by one supervisor has meaning and can be utilized by higher officials and by other supervisors.

Fairness to Employees.—One of the most outstanding features in the evaluation of employees is the fact that different supervisors will evaluate the same employee in different ways. In addition, a given supervisor will not have the same opinion of an employee from day to day, but his evaluation fluctuates in accordance with his own mood and in accordance with the employee's variable behavior. This is commonly recognized, and accordingly merit-rating programs are often established for the purpose of providing checks and balances that will prevent any extremely unfair evaluations of employees. These checks consist of (1) having several persons rate each employee so as to prevent undue influence resulting from any individual's good or poor opinion, and (2) providing for periodic ratings so that action in the case of any employee will not be based upon an immediate judgment that may be made at a time of stress or urgency. It is considered important by many employers that the employees should know that they are being evaluated over a period of time and by several different individuals and are therefore not subject to the whims of any single person. The importance of this factor of fairness in the prevention of grievances arising from necessary management actions can hardly be overestimated.

Improving Employee Performance.—It is an axiom of human behavior that we seldom perform as well as we can unless we are motivated positively toward our best behavior. One of the best means for encouraging optimum performance is to give an awareness of the fact that the performance is being evaluated. It is therefore felt by most firms engaging in a merit-rating program that one of the objectives is that of encouraging employees to perform their work in the best manner possible. This motivational advantage is further

utilized by certain firms that determine an employee's rate of pay, within a fixed range, by the favorableness of his ratings.¹

In addition, a formal merit-rating program enables a supervisor more intelligently to give personal advice and guidance to his subordinates in connection with their self-improvement. In a recent survey of the attitudes of nonselling employees in a merchandising firm,² it was indicated by the employees that among the most important factors in their job satisfaction were "receiving help necessary to get results expected by management," "being able to find out whether work is improving," "reasonable certainty of a fair hearing and a square deal in case of grievance," "certainty of promotions going to best qualified employees." A merit-rating program enables the supervisor periodically and systematically to let each employee know where he stands, how he is performing, what his prospects are for advancement, and what weaknesses must be corrected for maximum progress. It is true that such advice can be given without a formal merit-rating program; it is an unusual supervisor, however, who finds time and opportunity to do so without the guidance and stimulation of a merit-rating program.

Guidance in Personnel Changes.—The ultimate objective in any industrial personnel program is to see that each position is filled by a person who is capable of performing the work and who is properly motivated to perform the work as required. The ultimate objective, therefore, of merit rating is to provide management with a guide that will enable the promotion of the best suited person in case of a vacancy and to ensure the demotion or transfer of unsatisfactory personnel to work for which they are better suited. It is felt by many people that proper decisions in such instances can be made only with the assistance of a continuous record of the employee, representing the evaluation of all qualified supervisors.

MERIT-RATING PROCEDURES

A number of methods have been developed for use in conducting a formal merit-rating program, each of these methods having its own special advantages and disadvantages, each suited to certain practical situations. In general a rating program can utilize one or more of the following basic procedures:³

¹ Kress, A. L., How to Rate Jobs and Men, *Factory Management and Maintenance*, Vol. 97, No. 10, October, 1939.

² Hauser, J. D., *What People Want From Business*, p. 29, McGraw-Hill Book Company, Inc., New York, 1938.

³ For a complete discussion of rating techniques see J. P. Guilford, *Psychometric Methods*, pp. 217-286, McGraw-Hill Book Company, Inc., New York, 1936.

1. Ranking employees in order according to relative performance or relative capabilities.
2. Rating each employee against a scale of value.
3. Recording each employee's behavior traits and personal qualities with the aid of a check list.

<i>RATING FORM</i>	
Rater _____	Department _____ Date _____
<p><i>Instructions to Raters:</i></p> <p>Consider how much initiative employee demonstrates. Does he act voluntarily in situations that deviate from routine? Does he seek new and improved methods? Or does he have a tendency to let things ride as they are, or even to resist changes?</p> <p>List your employees in order as they demonstrate initiative on the job. Put at the head of the list the person who shows most initiative, and at the bottom of the list the person who shows least. Halfway between top and bottom, put the employee you consider to be about average. Using these names as a guide, fill in the names of the other employees, using the column "Comments" to illustrate or explain your ranking.</p>	
Name	Comments
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

FIG. 52.—Representative rating form—rank-order rating method* (Ranking by trait: initiative)

* From Wortham, M. H., *Rating of Supervisors*, p. 37, California Institute of Technology, Pasadena, 1943.

4. Preparing narrative statements bearing upon employee performance and capabilities.

Most merit-rating programs make use of more than one of these basic procedures and the possible variations are unlimited. Each procedure will be discussed in more detail below.

Rank-order Ratings.—The natural way of evaluating a subordinate is to compare him with other subordinates. The rank-order method of rating is therefore a common way of thinking and one that supervisors find convenient to use. In Fig. 52 is shown a typical form used in ranking employees on one trait, initiative. A company using such a form also will have similar forms on which groups of employees may be ranked on other traits. This permits the comparison of employees with respect to the several traits considered important by the company.

In practice, this type of rating procedure is most easily used for relatively small groups of employees who are engaged in common or similar activities. It would be difficult to place in order the names of more than 20 or 25 employees; and in addition, a supervisor who has under his direction a variety of employees, *e.g.*, from a sweeper to a highly skilled machinist, could not use such a rating form effectively, because the individuals being rated could hardly be compared fairly. However, it is common in American industry to find working crews ranging in number up to 20 or 25, all of whom are doing similar work. In such situations, the rank-order method of rating is considered to be the most convenient and the most accurate.

One of the variations of this rating method is called the "paired comparison" method. Under this system, each individual in the group is compared with each other individual in the group and his total score depends upon the number of instances in which he is considered to be the better of the pair. Under this plan, each individual is actually rated many times, and the resulting ratings are usually more accurate than can be achieved by any other rating system. However, it is a tedious clerical job, and in consequence this system is rarely used in actual practice.

Scale Methods in Merit Rating.—A second method for conducting a formal merit-rating program is to establish a scale of value for each of several traits and to require the supervisor to compare each subordinate against these predetermined scales. In Fig. 53 is shown a typical merit-rating form using the scale method; in this example, the scales are established on the basis of brief descriptions of the degrees of each quality equivalent to each position along a scale. A number of variations are possible under this method with respect to the way of describing the several degrees of a trait; numerical, letter, or percentage scales are often used.

The scale method is without question the most widely used procedure for rating in industry. The main reason for its popularity is the fact that this system permits the rating of small or large groups of

MERIT RATING					
<div style="display: flex; justify-content: space-between;"> <div> <div style="border: 1px solid black; width: 100px; height: 15px; margin-bottom: 5px;"></div> <div>NAME OF EMPLOYEE _____</div> <div>CHIEF OF _____ DATE _____</div> <div>POSITION _____</div> <div>DEPARTMENT _____</div> </div> <div> <div style="display: flex; justify-content: space-between;"> <div>POOR</div> <div>BELOW AVERAGE</div> <div>AVERAGE</div> <div>ABOVE AVERAGE</div> <div>EXCELLENT</div> </div> </div> </div>					
INSTRUCTIONS TO RATER: READ THE CHARACTERISTICS AND VARIATIONS CAREFULLY AND RATE BY WHICH MARK (1-5) ON THE SCALE SHOWN IN EACH SPACE. JUDGE THE INDIVIDUAL ONLY IN ACCORDANCE WITH THE DESCRIPTION OF QUALITIES IN THE FOLLOWING RATING AND IN RELATION TO OTHERS YOU ARE RATING.					
SAFETY	A HAZARD TO HIMSELF AND OTHERS	TAKES CHANCES AFFECTING HIMSELF AND OTHERS	USUALLY WORKS SAFELY	WORKS SAFELY AND PROMOTES SAFE PRACTICES	UNUSUALLY CAREFUL TO PROMOTE SAFE PRACTICES FOR HIMSELF AND OTHERS
KNOWLEDGE OF JOB	KNOWS LITTLE ABOUT THE JOB	KNOWS ROUTINE ONLY	IS FAIRLY WELL INFORMED ON HIS WORK	WELL INFORMED ON ALL DETAILS RELATIVE TO HIS WORK	THOROUGH KNOWLEDGE OF PRESENT JOB AND RELATED WORK
VERSATILITY	CAN DO ONE JOB WELL SKILLED WORKER THE ONLY ALTERNATIVE	CAN BE USED ON OTHER WORK IF CLOSELY SUPERVISED	IS ABLE TO DO RELATED WORK WITH A MINIMUM OF SUPERVISION	CAPABLE OF PERFORMING SEVERAL JOBS WELL IN OWN TASKS OR DISPLACEMENT	CAPABLE OF PERFORMING NUMEROUS HIGH TYPE JOBS
ACCURACY	WORK IS VERY INACCURATE	ERRORS RATHER FREQUENT CARELESS WORKER	WORK USUALLY CORRECT	WORK CONSISTENTLY ACCURATE	EXTREMELY ACCURATE RARELY MAKES MISTAKE
PRODUCTIVITY	PRODUCTION FAR BELOW AVERAGE	PRODUCTION BELOW AVERAGE	PRODUCES AVERAGE AMOUNT OF WORK	PRODUCTION ABOVE AVERAGE	PRODUCTION WELL ABOVE AVERAGE
OVERALL JOB PERFORMANCE	POOR WORKMANSHIP	FAIR WORKMANSHIP	AVERAGE WORKMANSHIP	HIGH ORDER OF WORKMANSHIP	OUTSTANDING WORKMANSHIP
INDUSTRIOUSNESS	INDIFFERENT AT WORK LACKS CONSIDERABLE TIME UNNECESSARILY	CONSISTENTLY TAKES THINGS EASY OCCASIONALLY LAYS OFF WITHOUT ADEQUATE REASON	WORKS STEADILY REQUIRES SOME SUPERVISION	WILLING WORKER PERSISTENT ON ASSIGNED WORK	UNUSUALLY WILLING WORKER DOES MORE THAN THE REQUIRED WORK
INITIATIVE	WAITS TO BE DIRECTED AVOIDS PROBLEMS WHICH REQUIRE TIME AND ENERGY	DOES AN ATTEMPT TO GO AHEAD ON HIS OWN BUT IS EARLY DISCOURAGED HESITATES TO TACKLE DIFFICULT JOBS	WOULD AMONG THOSE WHO START THINGS REQUIRES HELP ON DIFFICULT JOBS	A LEADER IN AFFAIRS USUALLY SEES A JOB THROUGH	REQUIRE ONLY GENERAL GUIDANCE INITIATION IS OF THE HIGHEST ORDER AND STAYS WITH IT
JUDGMENT	CONCLUSIONS GENERALLY INCORRECT	INFLUENCED BY HEARSAY OR INSUFFICIENT DATA USUALLY UNRELIABLE	JUDGMENT CAN USUALLY BE RELIED UPON	BASES CONCLUSIONS UPON THOROUGH INVESTIGATION & FACTS RELIABLE	CONCLUSIONS GENERALLY LOGICAL AND RELIABLE
COOPERATION	UNWILLING TO WORK WITH AND ASSIST OTHERS	SCOLDING WILLING TO WORK WITH AND ASSIST OTHERS	GENERALLY WILLING TO WORK WITH AND ASSIST OTHERS	DEPENDABLE TO WORK WITH AND ASSIST OTHERS	UNUSUALLY WILLING TO WORK WITH AND ASSIST OTHERS
PERSONALITY	CREATES MANY UNFAVORABLE IMPRESSIONS	CREATES SOME UNFAVORABLE IMPRESSIONS	AGREEABLE TO WORK WITH	INTERESTING AND LIKEABLE MAKES A GOOD IMPRESSION	CREATES AN UNUSUALLY FINE IMPRESSION
HEALTH	CHRONICALLY POOR HEALTH EFFICIENCY BADLY IMPAIRED	FREQUENTLY ILL EFFICIENCY IMPAIRED	NORMAL HEALTH EFFICIENCY NOT AFFECTED	HEALTH GENERALLY GOOD	HAS MARKED VITALITY AND IS RARELY ILL

SEE OTHER SIDE

FIG. 53.—Representative rating form—scale rating method.

employees. Also it permits the rating of persons engaged in unlike occupations, and it permits several raters to participate in the rating of any group or part of a group. This flexibility in use makes it the most suitable rating method for the typical industrial situation in

which a supervisor is responsible for the evaluation of a variety of persons doing different kinds of work.

While the scale method of rating is convenient to use, it is by the same token somewhat less accurate than rank-order rating. This results from the difficulty experienced in securing mutual understanding among the various raters as to the meaning of the words on the scale.

Check-list Merit Rating.—Some firms provide for the rating of employees by means of a check list. Such a check list, of which a typical example is shown in Fig. 54, consists of a series of traits or descriptive words; the supervisor is required only to check those items that apply to the individual being rated. When a check list is carefully established and when an adequate system for evaluating the results is made, the check-list method of rating can be convenient and relatively accurate in use. However, it has not become a widely used rating method mainly because it does not easily provide for the comparison of employees. The check-list method shares with the scale method a flexibility in use that is desirable.

Narrative-comment Ratings.—Since human beings are necessarily complex and since the situations in which firms must evaluate people are also complex, it is commonly found that none of the rating procedures listed above is entirely adequate to provide an evaluation of an employee and an interpretation of what the evaluations mean. Most rating systems, therefore, provide for the addition of narrative comments that serve to explain or justify the comparison or scale ratings. Some rating plans, for example, require the rater to cite an example justifying each item on a check-list form. Others request the rater to indicate major weaknesses and major favorable qualifications for each employee being rated. Others may require the raters to indicate a recommended course of action with respect to the employee, such as promotion, special training, demotion, etc. In general, narrative comments serve to correlate the mechanism of rating with the complexities of the actual work situation. Such narrative comments cannot be used in comparing one employee with another since they are seldom objective enough for that purpose. However, their value should not be underestimated. Figures 55a and 55b show a typical rating form that utilizes the scale-rating method and provides encouragement for narrative comment in amplification of the ratings.

ACCURACY OF MERIT RATINGS

The value of a merit-rating program to a firm depends in large part, although not entirely, upon the accuracy of the ratings. Much

PART II

Instructions

1. Read over the statements below.
2. Check at least three but not more than five statements which describe the most outstanding characteristics of the individual.
3. In the space to the right, write an explanation, giving instances or examples which support your judgment.
4. On the opposite page, check at least one but not more than three statements which represent the most outstanding faults of the individual.
5. Write an explanation to support your judgment.

Outstanding qualities	Explanation
<input type="checkbox"/> 1. Reasons things out	<p>(NOTE: This is page 6 of an 8 page folder for rating supervisors. Pages 1-5 provide for narrative analysis or supervisor's performance and characteristics; page 7 provides a check list for outstanding faults; page 8 provides for a summary rating and recommendations. This form shown by courtesy of the Pacific Gas and Electric Company.)</p>
<input type="checkbox"/> 2. Very aggressive	
<input type="checkbox"/> 3. Tactful	
<input type="checkbox"/> 4. Knows his work	
<input type="checkbox"/> 5. Keen and alert	
<input type="checkbox"/> 6. Outstanding technical man	
<input type="checkbox"/> 7. Never loses his head	
<input type="checkbox"/> 8. Sticks to a job until it is finished	
<input type="checkbox"/> 9. Inspires confidence	
<input type="checkbox"/> 10. Develops good men	
<input type="checkbox"/> 11. Unusually sensible and sound judgment	
<input type="checkbox"/> 12. Always makes constructive suggestions	
<input type="checkbox"/> 13. Plans work well	
<input type="checkbox"/> 14. Grasps new situations quickly	
<input type="checkbox"/> 15. Carries on his work with zest and enthusiasm	
<input type="checkbox"/> 16. Good mixer	
<input type="checkbox"/> 17. Never shirks responsibility	
<input type="checkbox"/> 18. Wins cooperation and loyalty	
<input type="checkbox"/> 19. Takes an unusual interest in his men	
<input type="checkbox"/> 20. Always on top of his job	
<input type="checkbox"/> 21. Has a sense of humor	
<input type="checkbox"/> 22. Knows how to supervise	
<input type="checkbox"/> 23. Has ability to express himself clearly	
<input type="checkbox"/> 24. Open to new ideas	
<input type="checkbox"/> 25. Prompt and exact in action and decision	
<input type="checkbox"/> 26. Is a square shooter	
<input type="checkbox"/> 27. A pleasure to deal with	
<input type="checkbox"/> 28. Improves with acquaintance	
<input type="checkbox"/> 29. People naturally look to him for leadership	
<input type="checkbox"/> 30. Picks good men	
<input type="checkbox"/> 31. Has vision and foresight	
<input type="checkbox"/> 32. Has courage of his convictions	
<input type="checkbox"/> 33. Unusual capacity for work	
<input type="checkbox"/> 34. Exceptional ability to get results	
<input type="checkbox"/> 35. A self starter	
<input type="checkbox"/> 36. Presence of mind in an emergency	

FIG. 54.—Representative rating form—check-list rating method.

interest has accordingly been shown in the methods used to check the accuracy of ratings and in steps that will tend to increase their accuracy. Progressive users of rating methods have attempted to analyze

PERSONNEL SURVEY RECORD									
NAME _____		LOCATION _____							
PRESENT POSITION _____									
<i>Title</i>		<i>Usa</i>							
<p>INSTRUCTIONS TO RATER In rating this individual base your judgment as much as possible on specific events or occasions in which you have observed him. Base your judgment on observations both to his credit and to his discredit. Give due consideration to recent changes which appear to be permanent. Compare this individual with all others within your knowledge who are doing similar work. Indicate your judgment by placing a check mark on each line.</p>									
<p>I. PERFORMANCE IN PRESENT POSITION</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 20%;">lowest 10%</td> <td style="text-align: center; width: 20%;">next 20%</td> <td style="text-align: center; width: 20%;">middle 40%</td> <td style="text-align: center; width: 20%;">next 20%</td> <td style="text-align: center; width: 20%;">highest 10%</td> </tr> </table> <p>(Consider personal productivity and efficiency, performance of the unit for which he is responsible, alertness to methods of improving his performance, knowledge in his special field, all factors relating to his present performance of duties.)</p>					lowest 10%	next 20%	middle 40%	next 20%	highest 10%
lowest 10%	next 20%	middle 40%	next 20%	highest 10%					
<p>II. PERSONAL QUALITIES</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 20%;">lowest 10%</td> <td style="text-align: center; width: 20%;">next 20%</td> <td style="text-align: center; width: 20%;">middle 40%</td> <td style="text-align: center; width: 20%;">next 20%</td> <td style="text-align: center; width: 20%;">highest 10%</td> </tr> </table> <p>(Consider ability to maintain good personal relationships with superiors, subordinates and others with whom he works, consideration for others, tact and self-control, character and dependability, friendliness and fairness, all factors affecting his personal relationships.)</p>					lowest 10%	next 20%	middle 40%	next 20%	highest 10%
lowest 10%	next 20%	middle 40%	next 20%	highest 10%					
<p>III. CAPACITY FOR FUTURE GROWTH</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 20%;">lowest 10%</td> <td style="text-align: center; width: 20%;">next 20%</td> <td style="text-align: center; width: 20%;">middle 40%</td> <td style="text-align: center; width: 20%;">next 20%</td> <td style="text-align: center; width: 20%;">highest 10%</td> </tr> </table> <p>(Consider initiative and progressiveness, ability to see and plan ahead, ability to plan and coordinate the work of others, ability to analyze a problem and present his ideas, freedom from prejudice and bias, all factors affecting his future growth.)</p>					lowest 10%	next 20%	middle 40%	next 20%	highest 10%
lowest 10%	next 20%	middle 40%	next 20%	highest 10%					
<p>IV. INITIAL IMPRESSION:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 20%;">lowest 10%</td> <td style="text-align: center; width: 20%;">next 20%</td> <td style="text-align: center; width: 20%;">middle 40%</td> <td style="text-align: center; width: 20%;">next 20%</td> <td style="text-align: center; width: 20%;">highest 10%</td> </tr> </table> <p>(Consider dress, speech, enthusiasm, mannerisms, physique, stature, and any other factors which in your opinion affect favorably or unfavorably the initial impression of this individual upon customers or others with whom he comes in contact.)</p>					lowest 10%	next 20%	middle 40%	next 20%	highest 10%
lowest 10%	next 20%	middle 40%	next 20%	highest 10%					
<p>IN THE CASE OF LOW RATINGS ABOVE, EXPLAIN WHAT IS BEING DONE OR CAN BE DONE TO IMPROVE THIS INDIVIDUAL.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p style="text-align: center;">(See other side)</p>									

FIG. 55a.

their rating results, first, to determine their reliability and, second, to determine their validity.

Reliability of Ratings.—Ratings, like any other measures, are considered to possess reliability to the extent that they consistently give

similar results when applied under similar circumstances. One expects, therefore, that if ratings are reliable, two raters appraising the same employee will agree in their judgment. One also expects

WHAT ARE HIS FAVORABLE CHARACTERISTICS? DESCRIBE ANY ITEMS WHICH ENTITLE THIS INDIVIDUAL TO SPECIAL CONSIDERATION FOR TRANSFER OR PROMOTION. CONSIDER HIS AMBITIONS, SPECIAL INTERESTS OR KNOWLEDGE, EFFORTS TO IMPROVE SELF, OUTSTANDING ACCOMPLISHMENTS, ETC. EXPLAIN FULLY.

WHAT ARE HIS PRINCIPAL DEFICIENCIES? DESCRIBE ANY ITEMS WHICH MAY INTERFERE WITH THE FURTHER DEVELOPMENT OR FUTURE SUCCESS OF THIS INDIVIDUAL. CONSIDER HEALTH, PERSONAL DIFFICULTIES, AGE, LOYALTY TO COMPANY, ATTITUDE, ETC. EXPLAIN FULLY.

HE IS BEST SUITED FOR PROMOTION TO OFFICE DETAIL _____
SOLICITATION _____

HE IS CAPABLE OF PROMOTION TO _____ OR _____

IN YOUR OPINION IS THIS INDIVIDUAL (CHECK ONE) IMPROVING ☐, STATIONARY ☐, RETROGRADING ☐.

RECOMMENDATION FOR NEXT TWELVE MONTHS: (Check one)

() Investigate for possible dismissal.	() Should be kept in present position
() Should be demoted.	() Should be given special experience or training for promotion (Explain)
() Should be transferred to different type of work. (What kind?)	() Should be promoted if possible

REMARKS _____

THIS INDIVIDUAL'S SURVEY AND PERFORMANCE RECORD WAS DISCUSSED WITH THE PRINCIPAL ON (date) _____ AND A PROGRAM WAS AGREED UPON LOOKING TOWARD IMPROVEMENT.

RATER _____	APPROVED BY _____
POSITION _____	POSITION _____
DATE _____	DATE _____

FIG. 55b.

that the same employee rated at different times will receive similar ratings unless he has actually changed in the intervening period. Comparisons of this nature show that merit ratings often are relatively unreliable but that careful ratings made by qualified raters under favorable circumstances can be highly reliable.

Table 155 shows the reliability correlations found by one large industrial firm for each item of a 12-item merit-rating form and also the reliability of the total ratings.¹ These results are based upon a comparison of pairs of simultaneous ratings made with a scale form similar to that shown in Fig. 53. It should be noted that those items that are a direct reflection of job performance such as knowledge of job, productivity, and industriousness are rated with greater reliability than the less objective traits such as cooperation and personality.

TABLE 155.—RELIABILITY CORRELATIONS OF EACH ITEM OF TWELVE-ITEM MERIT RATING SCALE.

Trait	Reliability
1. Safety.....	.35
2. Knowledge of job.....	.46
3. Versatility.....	.47
4. Accuracy.....	.45
5. Productivity.....	.46
6. Over-all job performance.....	.46
7. Industriousness.....	.47
8. Initiative.....	.48
9. Judgment.....	.45
10. Cooperation.....	.37
11. Personality.....	.39
12. Health.....	.36
Total.....	.55

TABLE 156.—DEPARTMENTAL DIFFERENCES IN RATING SCALE RELIABILITY
Correlation between Ratings
for Two Successive Years

Department	
A	.70
B	.59
C	.77
D	.55
E	.09
F	.77
G	.65
H	.61
I	.47
J	.44

When successive annual ratings were compared by the same firm in order to determine the reliability achieved by various departments of the firm, the results shown in Table 156 were found. The wide variance, .77 to .09, among departments was believed to be a reflection in part of the amount and quality of instruction given to the supervisors who made the ratings.

While reliability correlations of this magnitude and variability are commonly found for merit rating in business and industrial situations,

¹ Tiffin, J., *Industrial Psychology*, p. 252, Prentice-Hall, Inc., New York, 1942.

it must be remembered that such results are obtained by supervisors who have received limited training in rating procedures and who are, in some cases, not permitted or encouraged to give the time and attention required for the accurate rating of subordinates. Some firms, giving more than the usual care to this problem, have reported reliabilities as high as .85 to .95,¹ while the writer has found it possible consistently to secure rating reliabilities of .70 and over with adequately instructed and interested raters.

Validity of Ratings.—It is difficult to determine the validity of merit ratings because this requires some acceptable measure of the trait being rated to serve as a basis for comparison. Merit ratings are usually made by a firm because other measures are not available, so it follows that few validity studies have been made except in laboratory situations.

It has been possible, however, to estimate the validity of ratings in a negative manner by determining the relationships between the ratings and various measures that are believed to be irrelevant, on the theory that ratings having such relationships must to that extent lack validity. In this connection Tiffin² has reported an extensive study showing that one firm's merit ratings were influenced to an unexpected extent by an employee's age, length of service, department, and occupation. In addition, the intercorrelation of various traits indicated that this firm was not actually receiving independent appraisals on each of the rated traits. The inference from such studies is that there may be some serious limitations in the validity of business and industrial merit ratings that can probably be avoided only through more careful development of rating methods and more careful administration of the rating program.

The ultimate test of a merit-rating program would be to determine its influence upon the over-all performance of the firm. It is argued, with reason, that even relatively inaccurate ratings will serve to "spot" the extremely successful and unsuccessful employees who will require special supervisory attention. In addition, some of the objectives of a rating program (such as those of employee guidance and motivation) do not depend for their achievement upon the statistical reliability or validity of the ratings. A representative discussion from this broader point of view is given by Halsey³ who describes some administrative aspects of a merit-rating program and asserts the utility of ratings without reference to their statistical accuracy.

¹ Reference to the Western Electric Company given in Tiffin, *ibid.*, p. 251.

² Tiffin, *ibid.*, pp. 252-261.

³ Halsey, G. D., *Making and Using Industrial Service Ratings*, Harper & Brothers, New York, 1944.

RELATED PERSONNEL PROBLEMS

During recent years the attention of business and industrial leaders as well as that of social scientists has been drawn in a practical way toward broader concepts of individual occupational adjustment. The recognition of a need within each employee to integrate his economic life with his family, personal, and community life is not new; however, techniques now are being developed actively to promote such integration. In many ways, progressive business and industrial managers take account of the fact that each employee brings to his work a complete set of interests, preoccupations, attitudes, and other personal characteristics that have a direct bearing upon his performance on the job.

Employee counseling programs represent one application of psychological ideas to better management. In this activity employees are provided advice and assistance in connection with personal problems. While some firms limit the service to such matters as housing, personal finance, and legal questions, others provide professional service in the more fundamental personal problems that require the understanding and rationalizing of attitudes and personal relationships of a very complex nature. A recent book by Cantor¹ describes the manner in which such programs may be organized and gives an account of the pertinent counseling methods.

Another development in the personnel field is derived from the opinion and attitude-sampling techniques described by Houser.² The best and most generous intentions on the part of a firm's management will not necessarily result in a personnel policy that is acceptable to the employees. Some firms accordingly have undertaken to measure employee attitudes, opinions, and preferences as a basis for policy changes.

A third item of great promise in the application of psychological methods to personnel problems has grown out of the pioneer work by Harvard University and the Western Electric Company.³ This extensive study highlighted the importance of personal relationships among personnel in the immediate work situation and gave impetus to additional studies on the nature of supervisor-worker relationships and on informal social organization below the supervisory level.

Explorations such as these into the complex personnel problems of

¹ Cantor, Nathaniel, *Employee Counselling: A New Viewpoint in Industrial Psychology*, McGraw-Hill Book Company, Inc., New York, 1945.

² Houser, *op. cit.*

³ Roethlisberger, F. J., and Dickson, W. J., *Management and the Worker*, Harvard University Press, Cambridge, Mass., 1941.

business and industry give evidence that much remains yet to be accomplished in the application of psychology to this phase of human affairs and suggests that substantial progress may be expected in coming years.

SUMMARY

Personnel problems are among the most fundamental problems that confront the management of a business or industrial concern. The personal relationships within an organization and the adjustment of each individual to his working situation determine in part the success of the enterprise. Much attention has been given in recent years to the systematic study of personnel problems, toward the end that psychological principles may be more fully utilized in their solution.

One persistent problem that has yielded to psychological investigation is the problem of employee training. Methods developed in recent years have greatly facilitated the training of new employees and the retraining of present employees for the efficient performance of their duties. A second major problem has to do with the evaluation of employee characteristics and performance, toward the end that each employee may be assigned to work that permits optimum use of his capabilities. Formal merit-rating programs developed and applied with the aid of psychological methods represent an important step in the solution of this type of personnel problem.

RECOMMENDED SUPPLEMENTARY READINGS

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CHAPTER XV

PSYCHOLOGY IN WORK AND EFFICIENCY¹

- Work and Performance
 - The Nature of Work
 - Physical and Mental Work
 - Efficiency
 - Measuring Efficiency
- Variations in Efficiency
 - The Work Curve and What It Reveals
 - The Work Curve
 - Some Characteristics of Work Curves
 - The Physiological Cost of Work
 - Fatigue
 - Energy Consumption
 - Metabolism
 - Disturbed Coordination
 - Other Effects
- The Hygiene of Performance
 - Rest and Recovery from Work
 - Distribution of Rest Pauses
 - Unauthorized Rest Pauses
 - Use of Rest Pauses
 - Length of Working Day
 - Health and Hygiene
 - Industrial Hygiene
 - Personal Hygiene
 - Vision and Illumination
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 - Visual Requirements
 - Provisions for Greater Visual Efficiency
 - Illumination
 - Glare
 - Atmospheric Conditions Affecting Efficiency
 - Sunlight
 - The Atmosphere
 - The Cooling Power of Air
- Some Psychological Aspects of Efficiency
 - Why Men Work: The Problem of Motivation
 - Motives to Work
 - Effectiveness of Incentives
 - The Art of Motivation

¹ This chapter was written by Dr. Alfred G. Dietze, Associate Professor of Psychology, University of Pittsburgh.

Inhibition of Performance**Distractions****Effect of Distractions on Performance****Boredom****Efficiency through Method****Work Methods****Tools and Equipment**

Human beings proverbially want to get as much as they can for as small a price as possible. Carrying this bargain-seeking principle over into the field of work, it is not surprising that when men work, or employ others to work for them, they are bent on obtaining the largest possible returns for the smallest possible expenditure of time and effort. This, in essence, is the problem of efficiency upon which the modern age puts such a high premium. Many progressive industrial plants today employ efficiency experts to investigate the conditions that influence the performance of workers and to initiate practices to improve both the quality and the quantity of the product per unit cost of work. This chapter describes some of the factors that are related to variations in human efficiency and must be taken into account in the planning and supervision of work.

WORK AND PERFORMANCE

The Nature of Work.—Physics defines work as the product of force times the distance through which the force moves an object upon which it acts. This concept of energy applied to bringing about a change in a situation is basic to the use of the term *work* in the present context. However, we shall be concerned more specifically with the application of energy in the form of human effort toward the production of useful results.

Human work, thus conceived, involves metabolism, or the transformation of energy in the human body. This may be measured in terms of the amount of heat liberated by the organism during work. The large calorie is employed as a unit of measure for this purpose, designating the amount of heat required to raise the temperature of one kilogram of water one degree centigrade. Any heat liberated by the organism at work in excess of that liberated while the body is at rest may be ascribed to the energy cost of work.

Table 157 provides a summary of the energy expended by a man of average weight during an hour while performing certain common tasks requiring muscular activity. It is particularly instructive to note the wide variations in energy requirements for the different conditions listed. Assuming a basal metabolic rate the equivalent of the energy

consumed during sleep, even sitting quietly in a chair requires an additional expenditure of 54 per cent. Light work, such as typewriting, washing dishes, and ironing, requires approximately 50 per cent more energy than sitting, while walking doubles the energy expenditure over sitting. In walking upstairs one uses five and a half times as much energy as when walking slowly or eleven times as much as when sitting.

TABLE 157.—ENERGY EXPENDITURES AT VARIOUS COMMON TASKS*
(For a man weighing 70 kilograms)

Task	Calories Per Hour
Sleeping	65
Awake lying still	77
Sitting at rest	100
Dressing or undressing	118
Singing	122
Typewriting rapidly	140
Ironing, dishwashing	144
Walking slowly (2.6 miles per hour)	200
Carpentry, metal working, industrial painting	240
Walking moderately fast (3.75 miles per hour)	300
Severe exercise	450
Sawing wood	480
Swimming	500
Running (5.3 miles per hour)	570
Walking upstairs	1,100

* From Table 23 in Sherman, Henry C., *Chemistry of Food and Nutrition* (6th ed.), p. 185, The Macmillan Company, New York, 1941.

Physical and Mental Work.—Human work is often classified as physical or mental. When a man lifts a load he is said to be doing physical work; when he multiplies numbers or solves a business problem, he is said to be doing mental work. This distinction is misleading, since no clear basis for such differentiation can be found. Whether a man lifts a weight or performs an act of reasoning, he is consuming and applying energy through the sensori-neuromuscular processes that are always involved in activity. One task may use more of the larger muscles of the back, legs, and trunk; while another may utilize more of the finer muscles such as those of the throat and vocal cords. This is a difference of degree rather than of kind, and there is, therefore, no reason to assume that different principles govern mental work from those apparent in muscular work.

Efficiency.—Engineers define efficiency as the ratio of energy production to energy consumption. For the present purposes Poffenberger's definition may be accepted. This writer defines human

efficiency as "the production of the maximum output of the highest quality in the shortest time, with the least expenditure of energy and the maximum satisfaction."¹ Into the numerator of this equation for efficiency would have to be put everything that we get in return for work: quantity of the product, its quality, and the satisfaction that it brings to worker and consumer; while in the denominator belong all expenditures in terms of materials, time, energy, health, and satisfaction of the worker, etc.

Practically it becomes difficult, if not impossible, to devise methods whereby all the above factors can be equated and taken into account. Efficiency is relative. Poffenberger's definition is mentioned in order to emphasize the writer's belief that the effects of work on the workers themselves must not be lost sight of. Many of these effects are intangibles that do not lend themselves to measurement: human values, satisfactions, and the like.

Measuring Efficiency.—Not all the variables that enter into efficiency may be measured with sufficient accuracy to be made the basis for quantitative comparisons. Among the variables that can be quantified are included the factors of time, quantity, quality, and difficulty. Accordingly there result four methods of measuring human efficiency, *viz.*, (a) the measurement of the time required to do a unit of work, (b) the measurement of the number of units of work turned out per unit of time, (c) the measurement of the excellence of the product according to some acceptable scale of quality, and (d) the measurement of the difficulty of the task performed. The assumption, of course, is that for any one of these other factors are kept constant.

VARIATIONS IN EFFICIENCY

During the performance of tasks, not only is the objective situation constantly being changed in the sense that things are being shifted about in space or altered in form and substance, but the organism itself is undergoing many changes. These, in turn, are reflected in the efficiency with which the work is done. Two opposed phenomena are at work affecting variations in the quality and quantity of performance, as well as in the satisfaction that the worker derives from his activity. As a result of practice the performer is improving in his ability and efficiency; and as a result of energy depletion and other physiological and psychological changes his performance is adversely affected. The first of these is treated in Chap. IV of this book; the latter is considered more in detail in the following sections.

¹ Poffenberger, A. T., *Principles of Applied Psychology*, p. 364, D. Appleton-Century Company, Inc., New York, 1942.

THE WORK CURVE AND WHAT IT REVEALS

The Work Curve.—The course of work is graphically represented by the work curve. Time is plotted along the horizontal axis, and performance along the vertical. Thus variations in amount, quality, or speed of performance appear as variations from the base line in the vertical distances of the resulting curve. Figure 56 shows the ergographic record of a subject lifting a weight of one kilogram at the rate

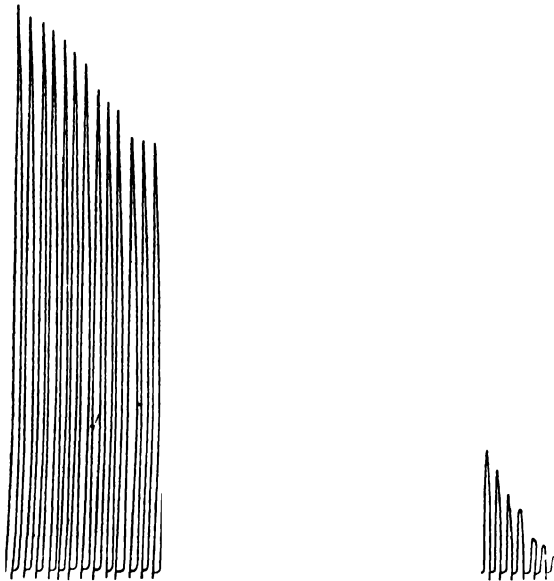


FIG. 56.—Ergograph record of the flexors of the middle finger of the right hand. (From Howell, W. H., *A Text-book of Physiology*. W. B. Saunders Company, Philadelphia.)

of one pull of maximum extent every other second, relaxing on the odd second. This work curve was made by means of an ergograph such as the one pictured in Fig. 57. As will be seen, decline in output is indicated by decreasing heights of the lines representing successive pulls as the work spell progresses. In Fig. 58 two additional work curves are shown representing other methods of measuring performance. The first of these represents the number of letters typed by a subject during successive minutes of the work spell; the other depicts changes that occur in the accuracy of typewriting during successive minutes of performance. It should be observed that decline in quality and quantity of performance is revealed by a descending direction of the curve; while decline in speed, *i.e.*, increase in time required to do a

unit of work or in quality as measured by the number of errors, is shown by an ascending direction of the work curve.

Some Characteristics of Work Curves.—A study of work curves obtained under varying conditions of the task and surrounding circum-

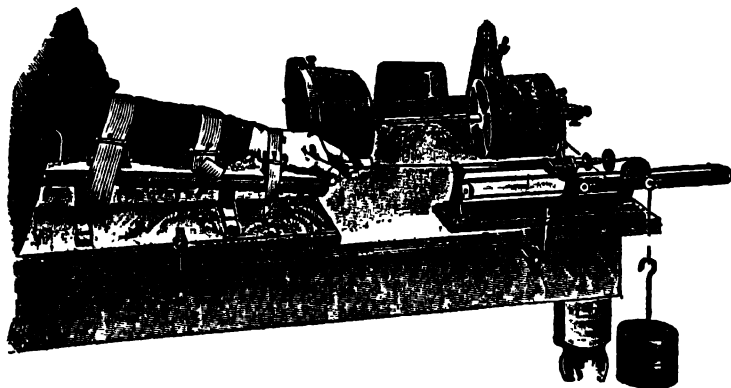


FIG. 57.—Mosso's ergograph. (C. H. Stoelting Company, Chicago, Ill.)

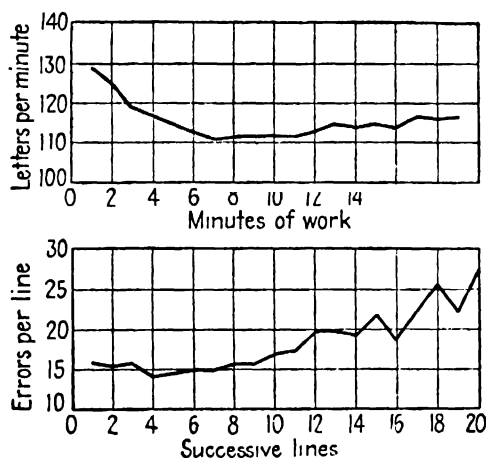


FIG. 58.—Work curves for rate and accuracy in typing letters of the alphabet. (Adapted from Robinson and Bills, *Two Factors in the Work Decrement*, *J. Exp. Psychol.*, 1926, 9, 415-443.)

stances reveals certain interesting features. Not all of these, however, appear in every curve. They vary with the nature of the task and with the conditions under which the task is performed.

The Work Decrement.—The most universal feature of work curves is the work decrement, called also the fatigue effect. This is a loss of efficiency that appears when a task is sufficiently prolonged and continuous. This effect appears in almost every type of activity,

e.g., when weights are lifted at a constant rate, in the daily and hourly output of industrial workers, in the semi-implicit symbolic tasks of typing and writing, and in the completely implicit operations of mental multiplication and the like.

There is considerable variation in the manner in which the work decrement appears. In Fig. 56 a gradual decline occurs at the beginning, followed by a period during which the worker seems able to maintain a steady output at a somewhat lower level, and followed again by a rapid decline until a point is reached where no further work can be done until the muscle is restored through rest. In other cases, however, a subject may be able to keep up a high level of

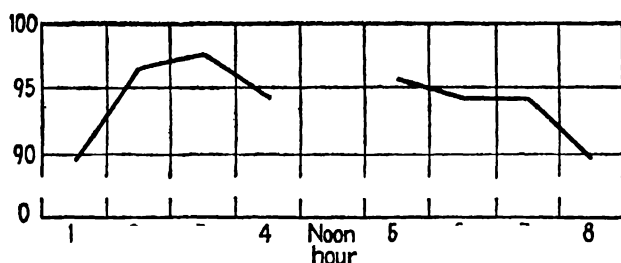


FIG. 59.—Production during an eight-hour day. (Adapted from *Pub. Health Ser. Bull.*, 1920, No. 106, 74.)

performance steadily, and then rapidly or gradually drop to the point where he can no longer perform. Investigations have shown that the form of the work decrement is a characteristic of the individual performer. No matter what muscle group is being investigated, and no matter what the task, a given individual will show a work decrement of the same general type. Laboratory investigations have also shown that when the point of complete inability to perform with a given weight has been reached, the subject can still lift a lighter weight; also that if a slower rate of work is imposed, the work decrement may be long delayed, or not appear at all.

The above facts suggest that the pattern of human performance has no simple explanation but is dependent on a complex set of psychological and physiological factors. This observation is of immense practical significance in a consideration of the problem of discovering conditions that will give optimal returns for a given expenditure of time and effort.

Warming-up.—Figure 59 presents an output curve for work during an 8-hour day in industry. Production is expressed in terms of the maximum output of which the plant is capable. Although a work decrement is apparent, it should be noted that, during the first 3 hours

of the forenoon, production rose from 89.6 per cent of maximum to 97.4 per cent. This initial rise in a work curve, appearing before a decrement sets in, is known as the warming-up effect. Similar warming-up phenomena are frequently observed in work curves obtained in the laboratory and in industry.

It is held that warming-up results from an increase in muscular efficiency when exercise has produced a certain amount of lactic acid and other metabolic by-products of muscular activity. These products are thought to be stimulating in small amounts, though in excess they bring about decreased efficiency in the form of the work decrement. Athletes habitually warm up before entering a game, and a

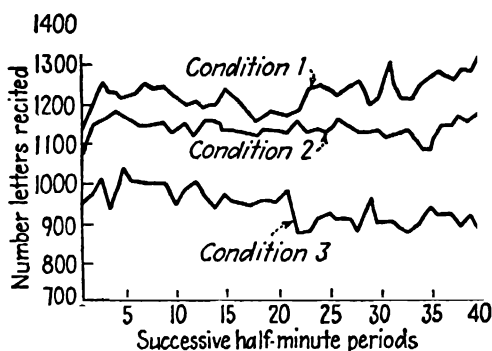


FIG. 60.—Warming-up effect in reciting letters of alphabet backward. (From E. S. Robinson and W. L. Heron, *The Warming-up Effect* *J. Exp. Psychol.*, 1924, 7, 81-97.)

baseball pitcher could hardly pitch a game without first putting his muscles into condition through warming-up exercises.

It seems that warming-up appears in the early part of a somewhat discontinuous activity, while in uninterrupted work a decrement sets in almost immediately. This is shown in an experiment by Robinson and Heron¹ in which subjects recited the alphabet backward under three different conditions: (1) continuously for 20 minutes; (2) alternating 30 seconds of recitation and 15 seconds of rest until a total of 20 minutes of work was performed; and (3) alternating 30 seconds of recitation and 30 seconds of rest for a total of 20 minutes of working time. The results are shown in Fig. 60. Notice that when work is interrupted, or discontinuous, the warming-up effect appears, while continuous performance results in an immediate decrement.

Much industrial work is of such an interrupted nature, hence a rise in production at the beginning of the work day is frequently a

¹ Robinson, E. S., and Heron, W. T., *The Warming-up Effect*, *J. Exp. Psychol.*, 1924, 7, 81-97.

feature of industrial-output curves. It should, however, be pointed out that some of the initial low level in the daily performance of workers is due to time spent in getting tools in shape, oiling machinery, and getting ready in general, activities that have little to do with variations in the work curve as a result of activity itself.

Spurts.—Most work curves reveal considerable fluctuation in performance throughout the course of a spell of work. Some investigators claim that temporary peaks of efficiency are a more or less regular feature of work curves. These peaks are known as spurts. Several types of spurts have been described. Of these the initial spurt and the end spurt are the most common.

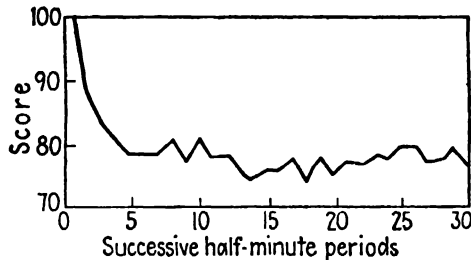


FIG. 61.—Initial spurt in addition. (After D. C. Chapman and W. J. Nolan, *Initial Spurt in a Simple Mental Function*, *Amer. J. Psychol.*, 1916, **27**, 256-259.)

The initial spurt is an unusually high level of performance during the early part of a spell of work. This effect is shown in Fig. 61, which depicts the number of columns of figures added in successive 30-second intervals for a total working time of 16 minutes. The most plausible explanation of this effect is that subjects overshoot their ability of sustained performance at the beginning and then hit a pace that they can more easily maintain.

The end spurt is a rise in the level of performance occurring near the end of a spell of work. It appears chiefly when the workers are aware of the approach of the end of the work period and probably is a motivational effect. The fact, however, that such a rise in performance level can occur at the end of a long period of tedious and exhausting work in which performance has previously dropped to a very low level is noteworthy. It reveals the fact that under certain conditions of high motivation the organism is able to mobilize reserve energy. William James¹ long ago noticed that, when one has worked to the point of apparent exhaustion, it is often possible to push through this point and

¹ James, William, "The Energies of Men," in *Memories and Studies*, Longmans, Green and Company, New York, 1911.

suddenly find that one can continue work with renewed energy, a phenomenon often referred to as "second wind."

Periodicity.—There is, furthermore, evidence that performance shows a more or less regular fluctuation in efficiency. Such periodic ebb and flow in the level of performance occurs in short as well as in long cycles. When behavior is observed over long periods of time there seem to be energy fluctuations occurring over several seconds, others over periods of minutes, and still others in which the alternations may require hours or days.¹ Philip² suggests that the periodic decline occurring in high-speed, continuous work is brought about by such factors as blocking, boredom, cramping of muscles, etc. These allow short periods of pseudorest during which the worker becomes aware of a slump in his performance and immediately strives to regain his rhythm. However, he overshoots the mark, going beyond his normal level, so that the conditions for the next slump are created. Kleitman³ has revealed an interesting correlation between the diurnal course of efficiency and the diurnal curve for body temperature. Peaks of efficiency and of quickness of reaction coincide with peaks in the temperature curve.

Blocking.—Bills⁴ has called attention to the fact that in mental performance the organism is not able to function continuously but that recurring interruptions occur at rates of as often as five times a minute, or slower. These gaps he calls *blocks*. They indicate temporary suspension of brain action for the particular task in progress. This phenomenon varies considerably with individuals and with tasks. Physical conditions that depress the central nervous system, such as alcohol and low oxygen supply, cause blocking to increase in duration so that in extreme cases as much as a minute may elapse between responses. Stimulants have the opposite effect.

Little is known about the causes of blocking and similar forms of periodicity in attention and performance; but, as Bills suggests, certain advantages accrue from knowing about them, in that such knowledge permits planning of one's work rate in such a way as to avoid some of the errors due to blocking and to benefit from peak periods in the

¹ Phillpotts, S. J., A Theoretical Curve of Fluctuations of Attention, *Brit. J. Psychol.*, 1934, 1935, **25**, 221-255.

² Philip, B. R., Studies in High Speed Continuous Work: I, Periodicity, *J. Exp. Psychol.*, 1939, **24**, 499-510.

³ Kleitman, N., *Sleep and Wakefulness*, Chap. 16, University of Chicago Press, Chicago, 1939.

⁴ Bills, A. G., Blocking: A New Principle of Mental Fatigue, *Amer. J. Psychol.*, 1931, **43**, 230-245; also *ibid*, *The Psychology of Efficiency*, pp. 55-58, Harper & Brothers, New York, 1943.

efficiency curve. To what extent this knowledge may ultimately affect practices in directing the work of others in offices, in factories, and in the schools, it is too early to surmise.

THE PHYSIOLOGICAL COST OF WORK

Fatigue.—Decline in the work curve is often explained as being due to fatigue. However, fatigue refers to so many different phenomena that have little in common that its use leads to confusion. Decreasing output is not invariably associated with either physiological fatigue or boredom. The concept of fatigue implies that work creates a condition in the worker that results in diminished capacity to perform. Such a condition cannot be directly observed but is inferred from the work decrement and other signs of waning efficiency. However, the fact that the work curve is affected by varying conditions of motivation and of surrounding conditions indicates that there is no single factor at work to produce lowered efficiency. Thus fatigue becomes merely a label designating the effects of work and should not be used as an explanatory principle. The effects of work may more appropriately be examined directly as indicators of the physiological and psychological cost of work.

Energy Consumption.—Work, as already has been said, consumes energy. The human organism, in performing work, actually generates more energy than it transforms into mechanical work. The mechanical efficiency of a machine is indicated by the ratio of work done to total energy generated. Applying this equation to the human machine in performing work, Fenn² has shown that an average man running at maximum speed generates about 13 horsepower of energy. Of this, 2.94 horsepower are consumed in useful work, the rest being wasted. This is a mechanical efficiency of 22.6 per cent for the human machine, which may be compared with the mechanical efficiency of various machines used by man. According to Hill,¹ a steam engine without condenser possesses an efficiency rating of $7\frac{1}{2}$ per cent and with condensers from 9 to 19 per cent; gas engines have an efficiency rating of from 14 to 28 per cent; and Diesel engines from 29 to 35 per cent. Thus the human machine is mechanically more efficient than the steam engine but considerably less efficient than a Diesel engine.

Much of the energy wasted in human performance is the result of

¹ Fenn, W. O., *Mechanical Energy Expenditure in Sprint Running as Measured by Moving Pictures*, *Amer. J. Physiol.*, 1929, 90, 583.

² Hill, A. V., *Living Machinery*, p. 69, Harcourt, Brace and Company, New York, 1927.

improper management of muscles. Too many muscles are used, and these muscles encounter unnecessary resistance from opposed muscle groups. The fact that well-trained performers use up less energy in doing a given amount of work than a novice doing the same is evidence for this deduction. Thus, with proper training, it is possible to learn to economize energy consumed during work.

Metabolism.—Physical work makes demands upon the circulatory and respiratory systems to provide the muscles with oxygen and fuel, to remove toxic products of metabolism, and to dissipate heat. Many things may go wrong, too, while the organism is at work: the heart may fail, the muscles may inadequately utilize their energy, or the physiological equilibrium of the entire organism may be strained to the breaking point.

Investigators have studied blood-sugar depletion during heavy work but do not find as great a change in workers accustomed to heavy manual labor as might be expected.¹ More important than sugar depletion in bringing about symptoms of exhaustion in workers doing heavy labor at high temperatures is the loss of salt (sodium chloride) through perspiration. This, however, may be effectively counteracted by taking salt in the drinking water or in the form of salt tablets. This is now common practice in heavy industries.

Disturbed Coordination.—In an investigation of the effect of fatigue on muscular control in ergographic work, Ash² found that, as the work decrement becomes more and more evident in the performance of the middle finger, the adjacent index and third fingers make abortive contractions of increasing intensity. Thus it appears that as the muscles become exhausted for a particular load, a neural overflow into adjacent muscles occurs. That this increases the energy cost of the work accomplished and reduces efficiency is clear. The tendency to wasteful energy overflow accompanying the work decrement has been noticed in everyday tasks, too, and constitutes an important source of excessive physiological cost when work is continuous or too prolonged. An analogous effect was found by Davis³ to occur during mental performance. Since many jobs in modern industry require high-speed precision performance, the above results would indicate that it is important not to pace work so fast that lost precision will seriously affect the quality of the product.

¹ Dill, D. B., Bock, A. V., Edwards, H. T., and Kennedy, P. H., *Industrial Fatigue*, *J. Industr. Hyg. Tox.*, 1937, 18, 417-431.

² Ash, I. B., *Fatigue and Its Effect upon Control*, *Arch. Psychol.*, 1914, No. 31.

³ Davis, C. R., *Patterns of Muscular Activity during Mental Work and Their Constancy*, *J. Exp. Psychol.*, 1939, 24, 451.

Other Effects.—Attempts have been made to study changes in sensory acuity that accompany work. Older attempts to measure the supposed decline in acuity by means of the two-point cutaneous threshold or by means of sensitivity to faradic stimulation have not been too successful, perhaps because these reactions are too much influenced by other variables that tend to conceal the effects of work. However, Ferree and Rand¹ consider the ability of a subject to maintain maximal visual acuity over a period of 3 minutes and the speed of accommodation for near and distant objects as more promising criteria of fatigue. In as much as certain modern occupations, such as aviation, make great demands on visual acuity, this suggestion demands further investigation.

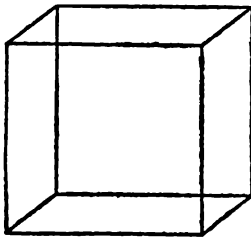


FIG. 62.—The transparent cube: a reversible figure.

Recently Hollingworth² has revived the attempt to measure the decline of efficiency in performance by means of ability to control attention. He found that, when subjects feel fatigued or have worked continuously for a period of time, their ability to control attention declines, this being shown by an increasing rate in spontaneous reversals when looking at an ambiguous figure such as the transparent

cube (see Fig. 62). Such alternation of attention is related to feelings of strain, blocking, and diurnal variations in work speed. If this finding is substantiated, it might be discovered that disturbances of attention are correlated with increased tendency to accidents after prolonged periods of labor.

Among many other criteria of the unfavorable effect of prolonged and continuous work may be mentioned the finding of Wickwire and Burge³ that the strength of the stimulus that will elicit the knee-jerk becomes greater at the end of a work day than it was at the beginning and that strenuous work during the day gives a more pronounced effect than lighter work. This is another indication of general organismic loss that temporarily results from work. The relative significance and relations between the various criteria of the physiological cost of work above described have not, as yet, been determined. That the organism pays a price when it behaves has, however, been amply illustrated.

¹ Ferree, C. E., and Rand, G., Lighting in Its Relation to the Eyes, *Proc. Amer. Phil. Soc.*, 1918, 57, 440-478; *ibid.*, Human Factor in Airplane Crashes, *Arch. Ophthalm.*, 1937, 18, 789-795.

² Hollingworth, H. L., Perceptual Fluctuations as a Fatigue Index, *J. Exp. Psychol.*, 1939, 24, 511-519.

³ Wickwire, G. C., and Burge, W. E., The Threshold Stimulus of the Knee Jerk as an Index to Physical Fitness, *Amer. J. Physiol.*, 1936, 118, 161.

THE HYGIENE OF PERFORMANCE

REST AND RECOVERY FROM WORK

In considering the safety of a bridge or other mechanical contrivance the ratio of its maximal capacity to the greatest load it is expected to bear is known as the *factor of safety*. Safe construction requires a margin of safety at least three times this factor. A similar concept may be applied to human work, where the factor of safety may be defined as the "ratio of maximal increment in metabolic rate to the observed increment in work." The margin of safety in work should also be at least three times the factor of safety. As Dill and his coworkers remark, "When such a margin of reserve energy is available tasks are carried out easily and with little awareness of exertion."¹ The hygiene of work requires the maintenance of this minimal margin of safety plus a sufficient reserve that the worker may invest in the enjoyment of activities of his own choosing at the end of the work day without seriously encroaching on the minimal margin.

Both productivity and recovery from work are dependent upon a complex set of factors. The limitations of language force the discussion of these one at a time, but the reader should bear in mind that what may be true under one set of conditions may no longer be true if even a single factor is changed. Thus the effect of rest pauses in a 10-hour working day may be quite different from the effect in a 6-hour day. Unfortunately, it is impossible to prescribe a set of ideal rules for achieving efficiency and counteracting the detrimental effects of work. Each type of work must be studied in relation to the conditions that happen to be peculiar to it. The fact that if work is continued beyond a certain point the physiological cost mounts rapidly has also been demonstrated in industrial investigations. To mention only one such study, Waller,² studying workers in a printing establishment, found that employees in the type-casting department expended as much energy during the last 2 hours of an 8-hour day as during the entire preceding 6 hours, measurements being taken in terms of carbon-dioxide production.

Distribution of Rest Pauses.—The question naturally arises as to what distribution and what length of rest pauses will give the best returns in industry. No categorical answer can be given to this question. Shepard³ required 12 college men to work continuously on a

Op. cit.

² Waller, A. D., The Physiological Cost of Printer's Work Measured by CO₂ and Expressed in Calories, *J. Physiol.*, 1920, **53**, 104-105.

³ Shepard, G. H., Effect of Rest Periods on Production, *Person. J.*, 1928, **7**, 186-202.

chest weight machine for 8 hours at a stretch. At certain points of the experimental sessions rest pauses of varying duration were introduced, during which the subjects were required to lie down and relax completely. Shepard concluded that a worker on light muscular work on an 8-hour shift cannot give his maximum output unless he rests at least 16.6 per cent of the time during the working hours.

Vernon and Bedford¹ studied the problem of introducing rest pauses into the work schedule of light industry. In one of their investigations the hourly output of girls employed at labeling during a 20-week period was compared with the output during a similar period in which the girls were given a 10-minute rest in the middle of the forenoon. In spite of the resulting 2 per cent loss in actual working time introduced by the rest pause, production increased 13 per cent. Another investigation showed a 13 per cent rise in the production of girls assembling bicycle chains when they were allowed to rest 5 minutes at the end of each hour of work.

In adopting regulations regarding the duration of rest pauses, the aim must, of course, be to allow sufficient time to overcome most of the deleterious effects of the previous work period without interfering with the continuity of work or introducing slumps in production from which the worker must recover through a warming-up period. All told, the experience of investigators seems to indicate a rest pause of 10 minutes duration for most industrial work and frequent rests of from 2 to 5 minutes per hour for mental work. The frequency of rest periods, moreover, must not be great enough to cut down the working time so much that the gain in efficiency during the actual working time will be at the expense of total productivity for the working day.

Regarding the location of rest pauses most investigators are agreed that rest is most effective when it is introduced at, or just after, the peak of the work curve. This position would have to be determined for each job. If the pause is introduced at this point, production ought, theoretically, to be maintained at a high level and the work decrement ought to be eliminated.²

Unauthorized Rest Pauses.—When workers are left to their own devices, they will often take rest pauses whether these are scientifically introduced or not. Very often these take the form of migrations to the lavatory, where a cigarette may be consumed and a few minutes conversation with fellow workers may be had. It is questionable whether

¹ Vernon, H. M., and Bedford, T., *The Influence of Rest Pauses on Light Industrial Work*, *Industr. Fatigue Res. B.*, 1924, No. 75.

² See Burt, H. E., *Psychology and Industrial Efficiency*, p. 179, D. Appleton-Century Company, Inc., New York, 1929.

the greatest benefit results under these circumstances, but in many plants the lavatory is the only place of respite without direct fear of censure.

All considered, authorized rest periods are no doubt more effective than unauthorized pauses. Relative to this point McGehee and Owen¹ observed the occurrence of unauthorized rest pauses among clerical workers in a government office and the relation of these pauses to production. They compared the results with those obtained when authorized rest pauses were introduced. The time used for resting was added to the total length of the working day. They found that less time was spent in unauthorized rest when rest periods were thus made part of the daily schedule than when no such provisions were made and that the daily output under such conditions showed improvement.

Use of Rest Periods.—How shall workers spend rest periods? Ramsey and Rawson² found that rest periods of 10 minutes duration are commonly found in various industries, though seldom as a result of scientific decision. These are most often spent in the workroom and used for the consumption of refreshments. Shepard, in the study previously reported, required his subjects to lie down and relax. Wyatt³ reports a study in which the following uses of rest period were effective in the order listed: complete resting in a chair resulting in a gain in efficiency of 9.3 per cent; uncontrolled rest with a gain of 8.3 per cent; listening to music with a gain of 3.9 per cent; having tea with a gain of 3.4 per cent; and walking about with a gain of 1.5 per cent. Bills⁴ believes that in the case of mental work complete relaxation may bring about an undesirable reduction in tonicity, making resumption of work difficult. He feels that a more active use of the rest pause is to be preferred.

The following principles well summarize the conclusions of extensive industrial researches in the U.S.S.R. relative to rest pauses:

- (1) Rest periods should never be less than 10 minutes in length.
- (2) Two 10-minute rest periods are more efficient than one 20-minute period.
- (3) The noon lunch hour should not be considered as a rest period.
- (4) The rest period should not be "earned" but should be allotted to everyone.

¹ McGehee, W., and Owen, E. B., Authorized and Unauthorized Rest Pauses in Clerical Workers, *J. Appl. Psychol.*, 1940, 24, 605-614.

² Ramsey, J., and Rawson, R. E., *Rest Pauses and Refreshments in Industry*, Natl. Inst. Industr. Psychol., London, 1932.

³ Wyatt, S., Rest Pauses in Industry, *Industr. Fatigue Res. B.*, No. 42, 1927.

⁴ Bills, A. G., *The Psychology of Efficiency*, p. 124, Harper & Brothers, New York, 1943.

(5) The action of workers during rest periods should be controlled so as to guarantee equivalent rest to everyone.

Length of Working Day.—The question of the optimal length of the working day, once a hotly disputed issue, may here be briefly discussed. Before the now universal introduction of the 8-hour day, it was not unusual for men to work as many as 100 hours a week and 15 to 16 hours a day. Now it is widely conceded that an 8-hour working day, or less, not only gives the worker more time in which he may pursue his own interests, but also results in a higher level of production and in fewer accidents. Thus it is fortunate that the shorter work day serves the interest of both workers and management. Only as an emergency expedient during times of national crisis, when a manpower shortage prevails, are longer hours resorted to, and then only on the basis of extra motivation in the form of over-time increase in pay.

Prior to the exigencies of the war there was a widespread tendency toward the adoption of a 6-hour day in many places. This gave rise to new problems, since under a 6-hour shift workers are required to work continuously and without interruption. No extensive data on output under these conditions are as yet available. However, Best¹ reports that of 282 workers in a mill who had experience with both the 8-hour and the 6-hour day, 23.0 per cent reported the latter as less fatiguing than the former; 42.5 per cent reported no difference; and 35.5 per cent reported the latter more fatiguing.

HEALTH AND HYGIENE

That health is a fundamental requisite of efficiency, and ill-health a prime cause of fatigue and inadequate performance must seem so obvious as to preclude the necessity of mention. Yet thousands of people, handicapped by ailments that require medical treatment, try to adjust to the demands of life and industry without even knowing that anything ails them. Such defects extend through the entire gamut of physical ailments that afflict mankind: flat feet, dental caries, optical defect, sinus infection, serious overweight and underweight, enlarged tonsils, etc. That this condition constitutes a serious drag on industrial efficiency throughout the nation and on the zest for living that is enjoyed by the population cannot be doubted. Nor can it be doubted that, when men and women blame their fatigue and lack of zest on how hard they work, the blame is misplaced. The margin of safety is threatened, not by hard work, but by continued ill-health.

¹ Best, E. L., U.S. Dept. Labor, *Reports*, 1934, No. 116.

Industrial Hygiene.—The individual who wishes to maintain and improve his efficiency must look to his health. Industry, too, recognizes this fact and includes industrial hygiene as an essential phase of industrial management. The scope of industrial hygiene may be judged from the following objectives of such a program as stated by Sappington:¹

1. Study the health of the employee and help him realize the best health and development of which he is capable.
2. Protect the worker against contracting disease from another, and also prevent him from conveying disease to another.
3. Study the natural health hazards of the industry and provide measures for their control.
4. Discover and call to the attention of the employee any defective health habits . . . and encourage the individual to secure proper correction.
5. Enlist the cooperation of skilled medical specialists . . . for the correction of defects among the personnel.
6. Provide special and optimum conditions for handicapped persons and furnish satisfactory supervision over them, especially with regard to proper occupational placement.
7. Provide a dispensary service which will give prompt and efficient attention to slight indispositions. . . .
8. Instruct the employee how to lead a life of health, and if he is defective, instruct him how to overcome . . . the handicaps which he possesses.
9. Furnish technical guidance and information to all the departments . . . with a view of improving the mental, moral, and physical status of the group.
10. Act as a coordinating mechanism on matters of personal health between the company, employees, other physicians, and all other existing health agencies. . . .

Sappington also considers the health hazards to which the industrial worker is exposed and which the hygiene program seeks to counteract in the interest, not only of greater efficiency, but also of individual welfare. These include dusts, metals, vapors, gases, industrial skin irritants, inadequate illumination, undue noise and vibration, postural strains, abnormalities of air pressure, abnormalities of temperature, radiant energy, and infection.

Personal Hygiene.—Among hygienic habits essential to efficiency are those relating to sleep and relaxation, exercise, diet, and the use of drugs. This is not the place for a detailed discussion of these basic hygienic problems. Requirements are largely individual, so that each

¹ Sappington, C. O., *Essentials of Industrial Health*, pp. 50–51, J. B. Lippincott Company, Philadelphia, 1943.

person must intelligently experiment to discover his own needs. He must take care, especially if he is a sedentary worker, to get enough of each and not overdo any hygienic requirement. Sleep and relaxation are discussed in Chap. II of this book, and diet and drugs in Chap. VII.

VISION AND ILLUMINATION

Sensory Hygiene.—Efficient performance involves the ability clearly to discriminate significant aspects of the environment. The worker must be able to see what he is doing, his tools, and the materials upon which he operates. He must be able to hear the voices of his fellow workers and, often, certain cues that tell him how the work is progressing or when there is danger. Usually, too, he must depend upon touch for guidance; and more rarely he utilizes the sense of smell and taste. To discriminate accurately requires healthy sense organs that the worker has learned to use well and has given good care. Of the several sense departments upon which the worker depends, vision presents the greatest number of problems. For reasons of space the present discussion is limited to this modality.

Visual Requirements.—Modern living imposes a heavy load on the visual functions from the earliest years and throughout life. Almost every job involves the ability to see, and many industrial jobs require specialized seeing skills. Some jobs require the worker to see accurately at close range, as in the case of inspectors and hosiery loopers; others require keen distance vision, as in the case of bus drivers and aviators; still others require the ability to distinguish differences of color, as in the case of textile workers and operators of color-printing presses. Industry is paying increasing attention to the visual requirements of various jobs and the visual qualifications of workers.¹

Modern optometry and ophthalmology, in their efforts to aid men to see more comfortably, have advanced far beyond the diagnosis and correction of structural and pathological conditions of the eye. There is an increasing recognition of the fact that seeing is an act of the whole organism and that faulty habit patterns may interfere with accurate visual performance as much as refraction. Seeing is a function of the nervous system as well as of processes taking place within the eye itself. Its hygiene cannot be restricted to the latter, and modern methods of eye training often accomplish what the mere fitting of glasses cannot do.

Among the factors involved in comfortable and efficient seeing the following are among the most common:

¹ See Tiffin, J., *Industrial Psychology*, Chap. 6, Prentice-Hall, Inc., New York, 1942.

Visual Acuity.—Visual acuity can no longer be presumed to be properly measured by separate determination of the acuity of each eye, for functional seeing involves the cooperation of two eyes. It not infrequently happens that an individual will have high visual ability in one eye while the other is covered, but very poor acuity when the two eyes are used together.¹ Acuity must also be considered relative to the distance at which the eyes are to be used. There is no high correlation between acuity in near and far vision. Tiffin² presents evidence for an inverse relationship between visual acuity tested at 20 feet and production in the case of hosiery loopers, the operators with the poorer vision being the more productive. However, when tested at a distance of 13 inches these workers had such good vision that the tests employed failed to discriminate between them. In view of such findings it becomes essential that workers be placed in jobs to which they are visually suited; or that they be outfitted with seeing aids that enable them to be proficient; or finally, that they be trained to use their eyes in the way their jobs demand.

Postural Coordination.—Pronounced inability in convergence, known as squint, is very obvious and interferes seriously with depth perception. Minor deviations, known as phorias, may or may not interfere with efficient seeing, depending upon the extent to which the individual is able to compensate for them. Such deviations may be due to faulty habits or to organic conditions; and they often impose a severe strain on the seeing mechanism, giving rise to serious inaccuracies of perception that, as Tiffin has shown, may influence efficiency on the job.

Stereopsis.—Faulty stereopsis, or depth perception, is often produced by the habit of suspension, the image of one eye being disregarded so that vision becomes essentially monocular. Such habits result in misjudgment of distances, an important function in the skillful operation of rapidly moving vehicles, etc. Stereopsis can be improved through orthoptic training.

Color Vision.—It is said that approximately 4 or 5 per cent of men are partially color deficient, the most common type being the confusion of red and green with yellow or gray. We have already indicated certain fields in which this ability is essential. Defective color vision is considered congenital and not subject to correction; however, its presence or absence in workers must be determined by appropriate tests to ensure efficiency and safety.

¹ See Betts, E. A., *The Prevention and Correction of Reading Difficulties*, p. 148, Row, Peterson & Co., New York, 1936.

² *Op. cit.*, pp. 139-140.

Provisions for Greater Visual Efficiency.—This is not the place for an exhaustive treatment of modern methods of eye care and the science of seeing, but a number of practices are listed that, under competent direction, foster better vision and greater efficiency on the job. These include

1. Optometry to determine an individual's visual characteristics.
2. Corrective methods for mechanical defects, including lenses and corrective exercise.
3. Orthoptic training for increasing ocular efficiency, especially in regard to stereopsis and convergence.
4. Job placement with respect to visual aptitudes of applicants and the visual requirements of the job.
5. Simplification of tasks to reduce the number and complexity of visual operations required of the worker.
6. Optical aids on the job, *e.g.*, magnifiers, projectors, gauges, etc., that obviate eye strain in the making of judgments of size, direction, quality, etc.; also occupational spectacles that adjust the focus for close work. Figure 63 shows graphically the improvement of production resulting from the use of occupational spectacles by hosiery loopers.
7. Devices to protect against dusts, splash, chips, etc.
8. Adequate illumination.
9. Periodic check-up and measures to maintain visual efficiency.
10. Education in eye care.

Illumination.—Seeing, as Luckiesh says, is a "partnership of vision and lighting," and one of the most direct ways to improve efficiency is to provide adequate illumination at the work place in accordance with the requirements of the visual tasks to be done. The effect of improved illumination is brought out in Fig. 64, which shows the effect of increasing illumination from 8 foot-candles to 60 foot-candles by means of supplementary lighting fixtures on the rate of production and of error in a key-punching operation. Production began to increase and errors to diminish as soon as the new equipment was installed, the production level ultimately reaching a point 60 per cent higher than under the previous conditions of low illumination.

How much light is required for different tasks is still a somewhat debatable question, depending upon standards of different investigators. Requirements vary with respect to individual differences in sensitivity to light. Ferree and Rand¹ found the upper limit of light intensity conducive to comfortable reading varying over a wide range

¹ Ferree, C. E., and Rand, G., Good Working Conditions for the Eyes, *Person J.*, 1936-1937, 15, 339.

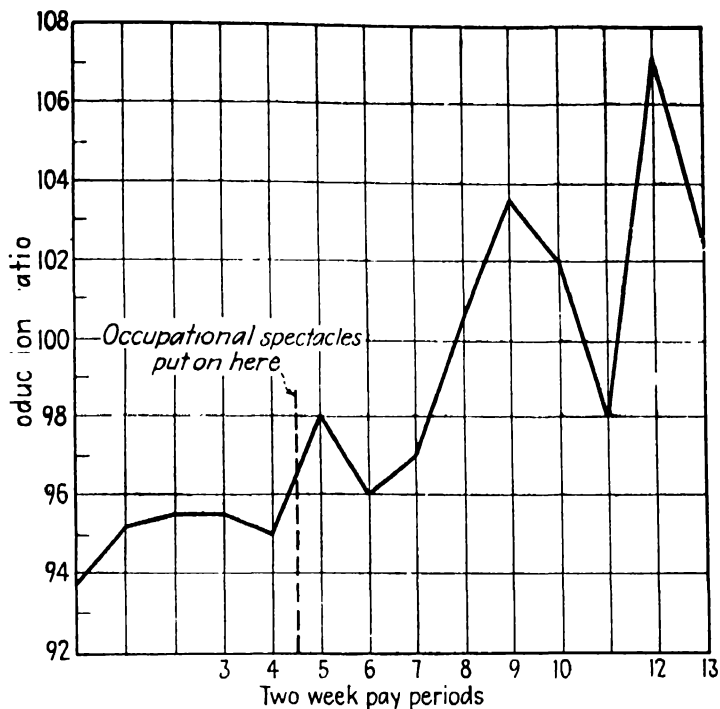


FIG. 63.—Increase in production of hosiery loopers after putting on occupational spectacles. (Adapted from Tiffin, Joseph, *Industrial Psychology*, Prentice-Hall, Inc., New York, 1942.)

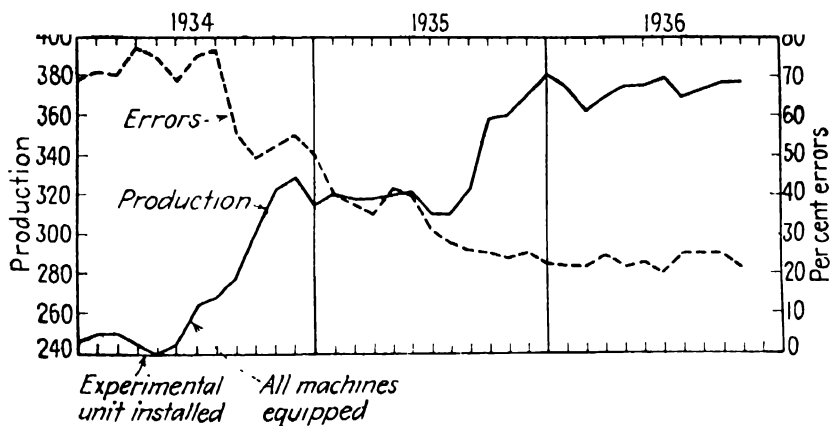


FIG. 64.—Effect of supplementary lighting on production and errors in a statistical key punching operation. (Adapted from Luckiesh, M., and Moss, F. K., *The Science of Seeing*, p. 275, D. Van Nostrand Company, Inc., New York, 1937.)

from below 5 to above 40 foot-candles in a group of persons ranging in age from ten to seventy-seven years. About half of these people found their upper limit for comfort in the range from 10 to 20 foot-candles.

Luckiesh recommends much higher lighting values than most other investigators, but in view of his lifelong research in this field his recommendations are given in Table 158. Judged by these standards many of the tasks performed by workers in the factory, in offices, and in the home are accomplished under conditions of illumination definitely too low, and Luckiesh's reference to a "half-seeing world" appears to be more than a figure of speech.

TABLE 158.—CONSERVATIVE FOOT-CANDLE RECOMMENDATIONS ON A RATIONAL BASIS OF CHARACTERISTICS OF THE VISUAL TASK AND REQUIREMENTS OF PERFORMANCE*

Foot-candles Required	For Tasks Such As
100 or more	Very severe and prolonged tasks such as fine needlework, fine engraving, fine penwork, fine assembly, sewing on dark goods, discrimination of fine details of low contrast as in inspection.
50 to 100	Severe and prolonged tasks such as proofreading, drafting, difficult reading, watch repairing, fine machine-work, average sewing and other needlework.
20 to 50	Moderately critical and prolonged tasks such as clerical work, ordinary reading, common benchwork, average sewing and other needlework on light goods.
10 to 20	Moderate and prolonged tasks of office and factory and, when not prolonged, ordinary reading and sewing on light goods.
5 to 10	Visually controlled work in which seeing is important, but more or less interrupted or casual, and does not involve discrimination of fine details or low contrasts.
0 to 5	The danger zone for severe visual tasks and for quick and certain seeing. Satisfactory for perceiving larger objects and for casual seeing.

* Adapted from Luckiesh and Moss, *The Science of Seeing*, Table LVIII, p. 345, D. Van Nostrand Company, Inc., New York, 1937.

Glare.—An important requirement of adequate illumination is that the visual field be evenly lighted. When contrasts of brightness exist, the worker will experience discomfort from glare. Examples of intense glare are the reflections of the sun from brightly polished surface, or the existence of a bright light source within the visual field, as when light is placed directly in front of the worker's eyes. Lower brightness differences commonly encountered are due to uneven illumination, deep shadows, etc. These are also glaring and interfere with proper seeing.

Responsible for visual interference and discomfort from glare is first the fact that the retina of the eye cannot adjust to greatly dis-

parate brightnesses, and the result is glare. There is, further, a reflex tendency of the eyes to turn to the brighter of two light sources, distracting vision away from the task at hand and reducing the quality of visual performance. The inhibition of these movements requires the opposition of antagonistic muscles, causing strain. Finally there may be continual fluctuation between the glare spot and the task, imposing intolerable strain on the eye muscles. These glare effects often result in feelings of general fatigue, nervousness, and even nausea and visceral upset.

Freedom from glare is difficult to achieve with artificial illumination since the light source must be close to the worker's eyes. It is not uncommon to find glare spots as much as a million times the light intensity of the darkest spots in the room. The worst lighting is found when there is a bare light source within the visual field. The best is indirect lighting, with no lighting units within the field of view, the light being reflected from the ceiling and walls. Unfortunately, this form of lighting is expensive. The cost of indirect illumination may be reduced by combining direct and indirect lighting, keeping the light source out of the visual field of workers as much as possible. When lights occur in the field of view, either they should be shaded or the worker should wear eye shades to shield the eyes from glare. Such shades should be opaque and should have a light, not a dark, lining, since the contrast of a dark lining with the surrounding field of illumination would introduce another source of glare. One of the most efficient methods of lighting is the controlled mixing of natural sunlight from large windows and artificial light in such a way that the illumination is kept at a constant level automatically.¹

ATMOSPHERIC CONDITIONS AFFECTING EFFICIENCY

Chief among the conditions of the surrounding atmosphere that influence the health and efficiency of men are sunlight, the composition of the air, and cooling power of the air.

Sunlight.—Sunlight is one of the essentials of organic life without which men cannot live for long. Insufficient light results in degenerative diseases, increased susceptibility to infection, and lassitude. In many industries men labor in semidarkness in places where the sun cannot penetrate. Workers in offices and factories, too, get insufficient exposure to sunlight during the working day. Even the smoke pall that hangs over industrial cities cuts down the effective sunlight by

¹ See Ferree, C. E., and Rand, G., *The Effect of Mixing Artificial Light with Daylight*, *Trans. Illum. Engng. Soc.*, 1926, 21, 588–609.

40 per cent or more, particularly in the winter. This constitutes a serious threat to the health of thousands of city dwellers.

Industry, to be sure, cannot make sunshine where the sun will not shine. The only remedy for inadequate exposure to sunlight in the interest of health and efficiency is to give workers sufficient time off during daylight hours. Daylight saving time, introduced first as a war conservation measure, has become a widespread practice that enables workers to arrive home early enough to enjoy several hours in outdoor activity. The industrial hygiene program should encourage workers in the practice of spending some time daily in outdoor pursuits.

The Atmosphere.—Pure air contains 78.14 per cent nitrogen, 20.93 per cent oxygen, 0.90 per cent argon, and 0.03 per cent carbon dioxide. In addition, the atmospheric air contains water vapor and many impurities in the form of fumes, vapors, dusts, etc. These may be harmful to man in certain concentrations.

Oxygen is an absolute necessity for organic life. Lack of it will cause death in a few moments. Fortunately the proportion of oxygen in the atmosphere where men live and work is very constant, rarely varying beyond the limits of 20 and 21 per cent. Thus lack of oxygen is not a problem under the usual conditions of shop and office. The recent development of high altitude aviation, however, presents problems in which oxygen want plays a more prominent role. Although the percentage of oxygen at high altitudes is the same as near the surface of the earth, the air is more rarified because of decreased pressure, so that an equal space contains less in absolute amount of the gas than at sea level. Thus at an elevation of 5000 feet above sea level the amount of oxygen is cut down 17 per cent, and at 10,000 feet by as much as 32 per cent. Under these conditions less oxygen is taken into the lungs by each breath, and this must be compensated for by more rapid breathing and heart action.

Reducing the amount of oxygen in the air being inhaled results in a series of psychological disturbances that have been investigated by McFarland¹ and others. The first disturbance to appear as a result of oxygen want is a loss of critical capacity and self-criticism. Subjects show mental confusion and faulty judgment. They may become emotionally upset but do not ascribe their emotional state, nor their failure in tasks attempted, to the effects of reduced oxygen intake.

¹ McFarland, R. A., *Psycho-physiological Studies at High Altitudes in the Andes*, *J. Comp. Psychol.*, 1937, **23**, 191-258; **24**, 147-220. The Psychological Effects of Reduced Oxygen Pressure, *Res. Publ. Assoc. Ner. Ment. Dis.*, 1939, **19**, 112-143. The Internal Environment and Behavior: I. Introduction and the Role of Oxygen, *Amer. J. Psychiat.*, 1941, **97**, 858-877.

This fact is now so well known in aviation that pilots are required to turn on their oxygen supply at a definite altitude whether they think they need it or not. Such disturbances are usually accompanied by feelings of exhilaration resembling those in mild alcoholic intoxication.

At a later stage of oxygen depletion both simple and complex psychological functions are impaired. High-speed coordination, attention, concentration, choice reaction time, speed and accuracy in arithmetic computation, etc., show marked decline in efficiency.¹ Still later, motor and habitual sensory processes become affected. Handwriting becomes illegible due to tremor and ataxia, letters are omitted or reversed in order and undergo a change in size. Vision is disturbed. The eyes fixate longer and make more frequent fixations per line of print in reading,² and dark adaptation is affected.³ When the oxygen concentration of the cerebral blood supply falls to below 24 per cent, consciousness is lost and muscular spasms occur. These and related findings are of especial importance for the development and safety of air navigation at high altitudes.

Carbon dioxide is given off into the air as a product of animal metabolism. It serves also to stimulate breathing. Excess CO₂ concentration is usually not a problem under conditions normally encountered in work. In the worst ventilated office, factory, or school, its concentration does not rise above 0.5 per cent, at which level it is harmless. Even a concentration of 2 per cent will cause no discomfort, although breathing will be accelerated about 10 per cent. Concentrations beyond this level rapidly increase the rate of breathing. A concentration of 6 per cent brings great distress, with headache, perspiration, and flushing, though no immediate danger to life. CO₂ does not act as a poison, even in large concentrations. Its effects are due to the displacement of the oxygen in the blood, thus producing a kind of anoxia.

Nitrogen becomes a problem only under conditions of high atmospheric pressure. In submarines, tunneling operations, and deep sea diving, men work under intense pressure, running as high as 50 lb. per square inch, or more than three times the normal pressure at sea level. High atmospheric pressure is not uncomfortable to the worker after a brief period of adaption; but under intense pressure nitrogen becomes

¹ Barach, J. E., McFarland, R. A., and Seitz, C. P., Effects of Oxygen Deprivation on Complex Mental Functions, *J. Aviat. Med.*, 1937, **8**, 1-11.

² McFarland, R. A., Evans, J. N., and Halperin, M. H., Ophthalmic Aspects of Acute Oxygen Deficiency, *Arch. Ophthalm.*, 1941, **26**, 886-913.

³ McFarland, R. A., and Evans, J. N., Alterations in Dark Adaptation under Reduced Oxygen Tension, *Amer. J. Physiol.*, 1939, **127**, 37-50.

more soluble in the blood and when the worker undergoes decompression small nitrogen bubbles may form in the body tissues. This is the condition feared by deep sea divers, which they refer to as "the bends." When decompression is too rapid there is extreme discomfort and pain, and under certain circumstances death may result. It is important that workers at high compression jobs breathe air as free from carbon dioxide as possible, since the latter stimulates excess breathing, thus increasing the amount of gases taken into the body to be dissolved in the blood.

Fumes, vapors, and dusts are impurities in the air sometimes present in harmful concentrations. Under such conditions they may threaten health and efficiency. Some of the substances resulting from industrial operations are extremely toxic, while others merely bring discomfort and distract the worker. Adequate devices for carrying away noxious substances and pouring fresh air into the worker's environment must be provided, or gas masks and other protective devices must be worn when the impurities themselves cannot be removed rapidly enough.

Vile odors, too, are present in some industries. Unless these are associated with toxic substances, they act more as psychological distractions than in a directly harmful manner. Since, however, distractions interfere with performance, unpleasant odors should be counteracted by introducing fresh air into the workroom. People differ widely in their tolerance for unpleasant odors, some finding it almost impossible to adapt to them.

Cooling Power of the Air.—Work generates heat. The human machine, therefore, like any other machine, must be cooled in order to function smoothly. The temperature of the human body must be maintained at a level near a mean of 98.6° F., a regulatory function depending upon most delicate physical adjustments under the varying conditions to which it is exposed. Most of the excess heat generated by the body as a result of activity is dissipated into the surrounding air. Since the latter is subject to great irregularity, the chief problem of ventilation is that of maintaining the cooling properties of the air at an optimal level for health, comfort, and efficiency. Space prohibits a discussion here of the several factors that are involved in cooling the body, *i.e.*, temperature, relative humidity, and the movement of the air. In general, however, the results of research show that a temperature of 68° F. at 50 per cent relative humidity is optimal for moderate physical work and for mental activity. Above and below these conditions discomfort will be experienced that may be sufficient to affect efficiency under otherwise normal working conditions, although under test conditions these effects may be counteracted by extra effort of motivated subjects.

SOME PSYCHOLOGICAL ASPECTS OF EFFICIENCY

Thus far attention has been given chiefly to physiological and environmental factors conditioning efficiency. Sometimes, however, the results of laboratory experiments and field studies seem altogether inconsistent. Under test conditions people often show a surprising ability to maintain a high level of performance under what, from an *a priori* viewpoint, appear to be the most unfavorable circumstances. At other times a contrary tendency becomes manifest, workers showing a decline in output when it would seem that all physical conditions are optimal. Hence efficiency cannot be assumed to be entirely, perhaps not even most importantly, a function of fuel, rest, temperature, and the like. What are the complicating factors that upset calculations? The answer must be sought in certain psychological phenomena that may vary independently of the physical aspects of performance. These include the phenomena of motivation, boredom, distraction, emotional maladjustment, and individual differences in personality and capacity.

WHY MEN WORK: THE PROBLEM OF MOTIVATION

The most fundamental factor accounting for good and poor performance, other previously described conditions being equal, is motivation. With strong motivation men often accomplish great things in spite of the severest handicaps; without it they are careless, bored, and idle. No man ever did anything without being motivated; consequently the master key to efficiency is the effective utilization of the motivational mainsprings that activate men. To get men to do their best it is necessary to know what their dominant wants are and to relate their work to these interests.

Motives to Work.—Basically men work in order to get food and shelter or the means with which to provide these. Of greater interest, however, in the present connection are the motives beyond mere subsistence for which men strive. The motives that energize men beyond minimum performance are socially derived and oriented. They include the desire to gain mastery over things and people, the desire to win esteem and recognition, and the need to respect oneself. Men will work for money to buy bread; but "man does not live by bread alone." To get him to do his best he must be offered incentives beyond bread.

An instructive experiment by Lee¹ illustrates the futility of financial incentive when other motives are disregarded. Young girls work-

¹ Lee C. A., Some Notes on Incentives in Industry, *Hum. Factor*, London, 1932, 6, 180-182.

ing at piece work were offered additional pay for increased output. Contrary to expectation, instead of rising, their production fell off 20 per cent. The reason for this drop was found to be the fact that the girls were required to turn over their earnings to their parents. When subsequently these same girls were told that they would be permitted to go home as soon as they finished a specified amount of work, they were ready to go home by 2:30 P.M. even though the specified quota was higher than the maximum of what they had been doing before.

Many studies reveal that men want other things from their labors besides high wages. Wyatt, Langdon, and Stock¹ obtained the following ranking in the order of preference of 10 motives from a group of factory workers:

1. Steady work
2. Comfortable working conditions
3. Good working companions
4. Good boss
5. Opportunity for advancement
6. High pay
7. Opportunity
8. Opportunity to learn a job
9. Good hours
10. Easy work

The first position of importance in this list is obviously given to the need for job security. Men who are uncertain of what tomorrow has in store for them are insecure and do not put forth their best effort. That liking for work can be increased by improving working conditions, the motive receiving second place in the above list, is a common-sense view confirmed by extensive studies on monotony and fatigue carried on at the Hawthorne plant of the Western Electric Company, reported by Mayo.² The third and fourth items in the list suggest the importance of favorable human relations as a motivating factor for workers. This, too, is amply supported by the results of systematic interviews with employees carried on at the Hawthorne plant over a period of three years, well summarized in the following quotation from Putnam:³

The comments from employees have convinced us that the relationship between first line supervisors and individual workmen is of more importance in

¹ Wyatt, S., Langdon, J. N., and Stock, F. C. L., *Fatigue and Boredom in Repetitive Work*, *Industr. Health Res. Bd.*, 1937, No. 77.

² Mayo, E., *The Human Problem in Industrial Civilization*, The Macmillan Company, New York, 1933.

³ Putnam, M. L., *Improving Employee Relations*, *Person. J.*, 1930, 8, 314-325.

determining the attitude, morale, general happiness, and efficiency of that employee than any other single factor.

Numerous researches report similar findings. To cite only one more, Houser¹ found the following factors of first importance in the opinions of workers: being able to find out whether one's work is improving or not, definite knowledge of what is expected of the worker on the job, some share in management, fair adjustment of grievances, safety, and opportunity to invest earnings in the company. More important than pay is the assurance that increases will be forthcoming when deserved and that the pay received is comparable to what other jobs of equal importance in the organization pay.

It would, of course, be a mistake to assume that pay is of minor importance as an incentive to work. Few people in a capitalistic society will work unless they get what they consider to be adequate pay, and sometimes pay is considered of first importance. Such was found by Schultz² among certain unskilled and semiskilled laborers, who gave the following reasons for wanting to work in the plant of their choice: (1) better and higher wages, (2) steady work, (3) better working conditions. Since money is the direct tangible reward for work in terms of which a man's services are measured, it is bound to be of central importance.

Effectiveness of Incentives. *Success.*—The effect of incentives in raising the level of work has repeatedly been demonstrated in the laboratory. A common class demonstration is to have a subject perform on the ergograph blindfolded and again, after suitable rest, with full view of the record that he is producing on the kymograph. Knowledge of results under these conditions is often from 10 to 20 per cent superior to working without such knowledge. In industry, too, "nothing succeeds like success." That workers are aware of this is shown by Houser's findings, previously cited, that employees of a merchandising concern listed "being able to find whether one's work is improving" third in importance among 28 items listed. The negative effects of failure, expressing themselves often in lasting attitudes of failure, are also well known. Thus Kolsted³ found the general morale of low-selling employees of a department store significantly lower than that of successful sales clerks.

¹ Houser, J. D., *What People Want from Business*, McGraw-Hill Book Company, Inc., New York, 1938.

² Schultz, R. S., *Psychology in Industry*, *Person. J.*, 1937, **16**, 221-223.

³ Kolsted, S., *Employees' Attitudes in a Department Store*, *J. Appl. Psychol.*, 1938, **22**, 470-479.

Competition.—In western culture the desire for recognition from one's fellows manifests itself in competition and rivalry, the desire to outdo and to excel. This tendency begins at an early age. Moede¹ had boys squeeze a hand dynamometer individually and in paired competition with another boy. The average difference in the scores was about 11 per cent in favor of the competitive condition.

When college students were given the task of printing newspaper copy with individual rubber stamps under conditions (a) that they were to do as much as possible but maintain the quality of their performance and (b) that they were to try to do their best to beat the others, Whittemore² found the average gain under the second condition as compared with the first was 26 per cent. The originally poorest performers showed the greatest gain. However, under conditions of rivalry it is generally found that the quality of the work suffers, this effect being most evident in the better subjects. Since competition is so often exploited in industry in the form of production contests and sales contests, this effect on the quality of performance must be kept in mind so that competition as a motivating device is not pressed beyond the limits of its usefulness.

Praise and Encouragement.—A great deal is heard these days about humanizing industry. What is the effect on output of praise and friendly consideration for workers? As was shown in Chap. IV, Hurlock³ found praise to be superior to reproof in motivating school children. In another experiment Laird⁴ subjected to severe "razzing" a group of college boys pledging to a fraternity. In the first part of the experiment the boys were tested in motor performance under conditions of friendly competition in the presence of members of the fraternity. Later each subject was required to perform in a room while the onlookers made disparaging remarks and hurled insults at them. Most of the subjects did worse under the second condition.

What of men in industry? Is it better to be "tough" with workers or to show a personal interest in them and to praise them for what they accomplish? That workers put forth their best efforts under conditions of praise and encouragement is well shown by an experiment of Mayo.⁵ Mayo was really studying the effects of illumination and

¹ Moede, W., *Der Wetteifer, seine Struktur und sein Ausmasz*, *Z. Pädag. Psychol.*, 1914, **15**, 353-368.

² Whittemore, I. C., *The Influence of Competition on Performance; an Experimental Study*, *J. Abnorm. Soc. Psychol.*, 1924, **19**, 236-253.

³ See Table 52 in Chap. IV.

⁴ Laird, D., *Changes in Motor Control and Individual Variations under the Influence of "Razzing,"* *J. Exp. Psychol.*, 1923, **6**, 236-246.

⁵ Mayo, Elton, *Supervision and Morale*, *Hum. Factor*, London, 1931, **5**, 248-260.

ventilation on industrial performance, for which purpose he isolated several girls in a special room in the factory to serve as subjects. The experiment extended over a period of about two years during which these girls worked for varying lengths of time under the different conditions investigated. The surprising result was that output kept increasing and was practically unaffected by adverse conditions. Mayo explained this outcome as due to the special attention the girls were receiving during the experimental period. They were frequently interviewed and consulted about the changes that were made. Thus they were given a feeling of importance, a feeling that they had a responsibility, the significance of which they understood and appreciated.

The Art of Motivation.—This section may be concluded by a brief discussion of a few principles that may be used in the effective manipulation of incentives for motivating others and oneself. The principles that follow are supported by research on animals and on human beings under laboratory conditions. Their applications are pointed out.

1. The effectiveness of a motive depends upon its strength. When rats must cross an electrically charged grill in order to get food, they will make more crossings the longer they have been without food. In the case of human beings, too, the more they desire a given end, the harder they will work for it, provided that the goal is not deemed unattainable. Therefore, effective motivation requires setting up attractive goals.

2. The effectiveness of motivation depends upon the adequacy of the incentives offered. White rats will learn a maze more quickly when they are rewarded with bran mash than with sunflower seed. Human beings, too, demand adequate returns for their efforts. When white rats fed on bran mash are switched to a diet of sunflower seed, the trend in work reverses. So too, disappointments may be expected to reverse the curve of productivity of workers on the job.

3. The effectiveness of motivation depends upon the certainty of reward. This is well illustrated by the old story of the boy who cried, "Wolf! Wolf!" when there was no wolf. After several repetitions of the false alarm a wolf actually did come to attack the sheep, but when the boy again cried for help his rescuers did not heed his cries. One cannot keep men contented for long with idle promises of higher wages, better conditions, etc. Even the mere suspicion that a promised reward has impossible strings attached to it will have demoralizing effects.

4. The effectiveness of motivation depends upon the nearness of the reward. Another conclusion from the animal laboratory applies to human workers. Incentives must bring their effects in a reasonably

short time, else they will be ineffective. Goals should be made immediate. This quality is lacking in many of the complicated wage incentive methods.

5. The effectiveness of motivation depends upon the attainability of the rewards. No matter how strong the desire for a reward may be, the end must be a realistic one within the capacity of the individual to reach. Grown men no longer reach for the moon, and a certain way to put a man into a slump is to suggest that he strive for the impossible.

6. To be effective as motivations incentives must be easily understood. Complicated schemes prevent the focusing of attention on the objective. Incentives that are too complicated not only fail to motivate but may even arouse resentment and antagonism, as Uhrbrok¹ has shown in respect to certain complicated wage-payment methods.

7. The effectiveness of motivations depends upon the relations of separate motives to each other. Motives do not act in isolation but in complex interaction. Every man's life contains conflicting tendencies. Knowledge of motivation is as yet too new for psychologists to be able to describe the dynamics of motivational interaction in a simple manner. This much, however, is certain, that a man's efficiency will vary directly with the degree to which his various drives and wishes incite him to act in the same general direction, and with the extent to which secondary motives are satisfied, yet kept subordinate to the main drives of the individual's life. The worker on the job is not a different person from the worker when he is at home. If the job interests and extra job interests are in harmony, motivation should be good. If they are in disharmony, low morale is inevitable. When a man is hired it is the whole man with all his wishes and yearnings and with all his conflicts who is hired, not just his work skills.

INHIBITION OF PERFORMANCE

Distractions.—The conditions that affect men while at work are not limited to stimuli that have to do directly with the tasks in which they are engaged. At all times a multiplicity of sights, sounds, odors, pressures, etc., compete for attention, most of them quite incidental in nature. Efficiency is a resultant of all the forces that during a given period of time influence behavior, including conditions already discussed and others still to be considered. Among the latter are those that are described as "distractions," i.e., stimuli that interfere with

¹ Uhrbrok, R. S., *A Psychologist Looks at Wage Incentive Methods*, American Management Association, Management Series, 1935, No. 15.

performance and disturb the worker. Distractions may be external in source, such as loud noises, unusual sights, and foul odors; or they may be due to internal states of boredom, dissatisfaction, or emotional conflict. Thus a distraction is not a unique form of stimulation but simply a matter of paying attention to stimuli that are foreign to the task one is supposed to be doing. Certain attributes of stimuli have a peculiar advantage in attracting attention and therefore are distracting if they are unrelated to one's task. They include such factors as intensity, sudden change, movement, unusual quality, and duration, or persistence.

Effect of Distractions on Performance.—The results of investigations regarding the effects of distractions are not unequivocal. On the one hand, it is common observation that workers are disturbed by the occurrence of unusual or intense incidental stimuli; and on the other hand experimental laboratory studies show little, or no, detrimental effects of so-called "distractors." Indeed, the effect may under certain circumstances be beneficial.

In an experiment on the effects of distraction on thought processes Hovey¹ equated two groups of college students on the Army Alpha Test. Six weeks after the initial test both groups were again tested with another form of the Alpha, the experimental group being exposed during the testing to severe distraction. Bells, buzzers, shrill whistles, organ pipes, and other noisemakers were sounded, while a phonograph played lively music. Spotlights were continuously flashed off and on in utter confusion, while assistants were constantly going in and out with a great deal of ostentation in manner and garb. In spite of these unusual conditions, the experimental group performed nearly as well as the control group, making a score of 133.9 as compared with 137.6 for the controls. This is a loss of only 3.7 points ascribed to the distractions.

In a classic experiment Morgan² tested the effects of noise on the performance of subjects engaged in code substitution, by means of a typewriterlike apparatus that also automatically recorded the strength of the subjects' responses. Work was first performed under conditions of quiet; then the distractions were introduced, followed by another 10 minutes of quiet. The distractions were in the nature of loud and unpleasant noises. The subjects improved in the task throughout the experiment, although at the onset of the distracting conditions there

¹ Hovey, H. B., Effects of General Distraction on the Higher Thought Processes, *Amer. J. Psychol.*, 1928, 40, 585-591.

² Morgan, J. J. B., Overcoming of Distractions and Other Resistances, *Arch. Psychol.*, 1916, No. 84.

was some temporary slowing up of the work. Most subjects, however, regained their previous speed quickly and went on to further improvement during the period of distraction. When the noises ceased there was again a brief slump, so that it appears that cessation of noise is also distracting once subjects have become accustomed to it.

Morgan points out that subjects tend to overcome distractions by putting forth extra effort, this extra effort being in excess of that needed to overcome the disturbing influences. Hence, paradoxically, distractions may have a facilitating effect on work under these conditions. Similar conclusions were reached by Ford,¹ who investigated the effect of noises on the performance of intellectual tasks.

It seems, then, from the above considerations that the effects of distractions are closely related to motivation. The motivated subject overcomes the deleterious effects of unfavorable temperature, unfavorable atmospheric conditions, foul odors, and distracting noises. He does this by putting forth extra effort, which in Morgan's experiment was shown by harder pressure exerted by the subjects on the keys of the apparatus during distractions than during periods of quiet. Other experimenters have shown that negative adaptation to distraction sets in rapidly if the distraction continues or is repetitive. Thus the extra effort, or excess energy cost of work, under distracting conditions finally becomes negligible. This is apparent in an experiment by Davis,² the results of which are illustrated in Fig. 65. This study investigated the effort expended by a group of subjects during periods of quiet and of noise. The subjects did no work but sat in a chair during the experiment, and action potentials from the forearm were recorded. Following an initial 5-minute period of quiet, three cycles alternating 2 minutes of noise and 2 minutes of quiet were studied. This was done on 5 successive days. It will be noticed that on the first day of the experiment a sharp increase in action potentials occurred at the onset of noise in each instance but that on successive days this effect became less and less pronounced. This type of adaptation takes place in a variety of distracting circumstances and presents an excellent illustration of the adaptive capacity of the human organism.

Boredom.—Most baffling among the many types of distractions are certain subjective conditions to which workers are prone, outstanding among these being boredom, or lack of zest for work. Although the

¹ Ford, A., Attention-automatization: an Investigation of the Transitional Nature of Mind, *Amer. J. Psychol.*, 1929, 41, 1-32.

² Davis, R. C., The Muscular Tension Reflex and Two of Its Modifying Conditions, *Ind. Univ. Pub., Sci. Ser.*, 1935, No. 3.

bored man's muscles do not ache from fatigue, and although he has not infringed upon the margin of safety, he nevertheless shows a work decrement. This is clearly illustrated in Fig. 66, which depicts changes in the output of a worker assembling bicycle chains under

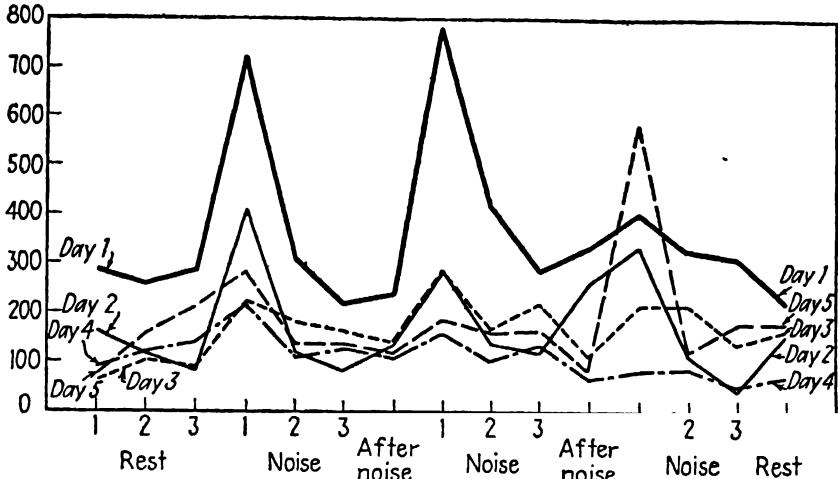


FIG. 65.—The effects of distraction on muscle tension. (From R. C. Davis, *The Muscular Tension Reflex and Two of Its Modifying Conditions*, Ind. Univ. Pub., Sci. Ser., 1935, No. 3.)

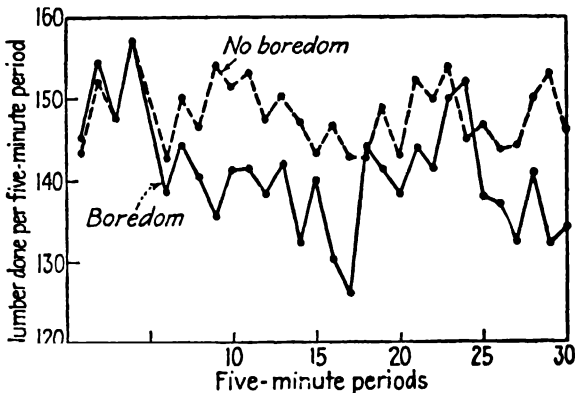


FIG. 66.—Effect of monotony in an assembly task. (Adapted from S. Wyatt and J. A. Fraser, *The Effects of Monotony in Work*, Industr. Fatigue Res. Bd., 1929, No. 56, 10.)

conditions in which he reported boredom compared with a similar period in which he was free from boredom. Boredom set in after about 5 minutes of work, at which point the two curves diverge, the work under the condition of boredom showing a sharp decrement. At the end of 100 minutes of work this worker believed the end of the dis-

tasteful work period to be near, and his production curve rose accordingly for a while. When the quitting signal did not occur, the work level dropped again. In Fig. 67 is shown the diurnal curve of output of an industrial worker who reported boredom usually about the middle of a working spell. Note the sharp drops in output correlated with these periods.

The causes of boredom are to be discovered in the worker rather than in the objective conditions of work, although it is frequently associated with monotony or sameness of the tasks performed. The

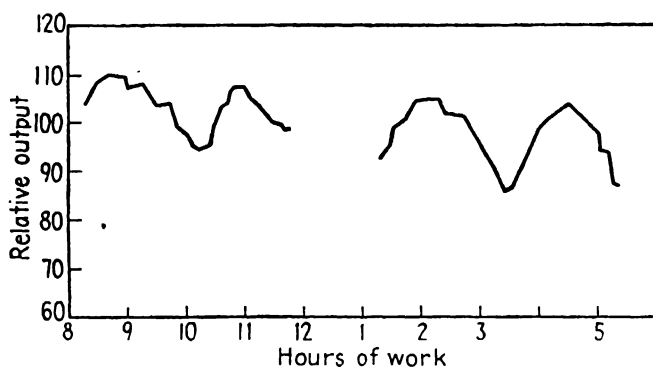


FIG. 67.—Relation between output and boredom in industrial work. Worker reported feeling of boredom about the middle of the forenoon and again about the middle of the afternoon. (Adapted from S. Wyatt and J. A. Fraser, *The effects of monotony in work*, *Industr. Fatigue Res. Bd.*, 1929, No. 56, 13.)

subjective nature of boredom is evident from the fact that activities that are very interesting to some people may create boredom in others. A concert that will thrill one person may be considered uninteresting by another. It is generally agreed that boredom occurs when an individual must attend to things because of duty although he wants to attend to something quite different. This conflict between subjective desire and duty sets up tensions that bring about a state of general weariness and loss of zest.

According to Poffenberger (*op. cit.*, p. 195), workers are most apt to show boredom in simple, highly repetitive, and rapidly repeated operations. Hence in industrial jobs boredom can be reduced by providing variety in the tasks performed, reducing the work tempo to a tolerable pace, providing for frequent rest pauses, and allowing for social intercourse during the work day. Some men, it should be observed, like monotonous work requiring repetition of the same task over and over again. For some people such work seems simpler than work requiring varied activity, and for others it gives time for thinking

about other things. The tendency to daydream must, however, be guarded against in jobs requiring strict attention.

EFFICIENCY THROUGH METHOD

It should be apparent to the reader that human efficiency is conditioned by every conceivable aspect of behavior so that its complete treatment would be coextensive with the whole of psychology and much of physiology. Elsewhere in this book the dependence of adequate performance in industry on individual differences in intelligence, special aptitudes, training, age, and sex are discussed. The dependence of efficiency on mental health and personality adjustment will be apparent from a reading of Chap. VI, while the roles of diet and drugs are discussed in Chap. VII. The remaining part of the present chapter is devoted to a consideration of methods of work, pointing out certain principles for economizing effort and time in the handling of a job. It is failure at this point that results in tremendous waste of human effort in industrial operations and in everyday life, a fact that led F. W. Gilbreth, the father of scientific management, to propose finding the easiest and most economical ways of doing a task as a first step in reducing production costs.

WORK METHODS

The Gilbreths developed the earliest procedures for economizing effort in work, calling their system "time-motion study."¹ They classified all movements into 17 fundamental classes, which they called *therbligs*, such as searching movements, grasping, assembling, etc. By means of special graphic devices they recorded the course of movements during the performance of a task; they introduced special cameras for recording, and the use of the stop watch for timing motions. By means of time-motion study they analyzed in great detail the movements that workers made in a job. On the basis of such analysis they taught workers how to eliminate unnecessary motions, developing the *one best way* of doing a job. Thus, in the case of bricklaying, Gilbreth found that he could reduce the number of movements made by skilled workmen from 18 to 5, thereby increasing the number of bricks laid per hour from 120 to 350. In other industrial jobs he was able to increase production anywhere from 50 to 150 per cent or more, by applying the results of time and motion-study analysis.

Although time and motion-study analysis has contributed greatly to the improvement of industrial efficiency, certain cautions must neverthe-

¹ Gilbreth, F. B., and Gilbreth, L. M., *Fatigue Study*, The Macmillan Company New York, 1919.

less be mentioned. In many of the reports of increased production resulting from this technique no study has been made of the energy cost of such methods nor of the satisfaction derived by the workers. As will be recalled, these are important factors in any acceptable definition of human efficiency. The assumption that there is a single "one best method" for doing a job may also be questioned, in as much as what may be a best method for one individual may not be so for another. Individual differences in strength, size, and other physical and psychological characteristics may require different combinations of movements for different individuals, even though analysis seems to point to a theoretical one best way.

Some of the principles characterizing efficient movements may be summarized as follows:

1. Successive movements should be so made that one movement ends in a position that leads easily and without lost effort into the next.
2. Movements should be so organized that little direction is required in passing from one movement to the next.
3. Movements should be so organized that an easy rhythm can be established that will result in the development of a single automatic act.
4. Movements should be smooth and steady. There should be no sudden shifts in direction of movements or their speed.
5. The number of movements that make up a job unit should be kept at a minimum.
6. Both hands should be used together, their movements synchronized. An idle hand wastes work opportunities.
7. A stroke should be delivered, if possible, at the point of maximal momentum of the movement.¹

TOOLS AND EQUIPMENT

An important requisite for efficient performance is the use of suitably designed tools and equipment. An early investigation of Frederic Taylor² is instructive. He found, on observation, that skilled shovelers in a plant lifted loads varying between 3½ lb. in moving rice coal to 38 lb. in moving ore. He set out to determine what load would permit a skilled man to move the most material in a day. Starting with a large shovel, he gradually reduced the size of the shovel from day to day until he discovered that a load of 21½ lb. enabled a skilled

¹ See Myers, C. S., *Industrial Psychology in Great Britain*, pp. 87 ff., Jonathan Cape, Ltd., London, 1926.

² Reported by R. M. Barnes, *Motion and Time Study*, p. 11, John Wiley & Sons, Inc., New York, 1940.

man to move the maximum amount of material per day. Accordingly he redesigned the shovels used for different purposes so that in every case men would move $21\frac{1}{2}$ lb. of material on a fully loaded shovel. The resulting increase in output was in the neighborhood of 300 per cent, and the cost of handling material was reduced by 50 per cent.

Industry is constantly striving to improve the design of tools and equipment to permit greater efficiency in their use. In many commonly used tools there is still considerable variation in the work required to operate various makes. Thus Norton¹ found a variation of from 81 to 111 units in the total work required to type a standard amount of material on five standard makes of typewriters all purchased at the same time. When these machines were analyzed according to the several features of operation, such as operating the letter keys, space bar, shift key, line spacer, and carriage return, he found that some machines required much less effort on some operations than others. No machine was superior or inferior in all respects, and if the best features of all five machines were brought together into one machine it would require about six-tenths of the effort required to operate the average of the five machines.

A feature of machine operations deserving special mention is the adjustment of the machine to the rhythm of the worker. It has been found that machine pacing of work results in greater efficiency than the irregular and sporadic movements that workers adopt when left to their own devices. However, it is extremely important that for every type of work and individual worker the optimum tempo be found in order to gain the greatest benefit in terms of production, energy economy, comfort, and personal satisfaction. As Wyatt and Langdon² report, if the speed of the machine exceeds the natural speed of the worker, the work will be irregular and fatiguing to the worker. On the other hand, if the speed is below the worker's capacity, dissatisfaction and boredom will result. It follows that an adjustment of the machine to the average speed of a group of workmen will be too fast for some and too slow for others. It would, therefore, be desirable to provide a variable adjustment for each machine so that each worker can adjust it to suit his own needs.

SUMMARY

Modern industry demands streamlined methods of production. At every hand it seeks the largest possible return for its expenditures.

¹ Norton, H. F., 'The Work Required to Operate Several Makes of Typewriters, *Trans. Amer. Soc. Mech. Engrs., Management*, 1928, 51, 29-36.

² Wyatt, S., and Langdon, J. M., *The Machine and the Worker, Industr. Health Res. Bd. Report*, 1938, No. 82.

This chapter undertook to summarize some of the problems relating to the elimination of waste in human work.

Work was defined in terms of human energy applied to the bringing about of useful, or at least desired, results. Physical and mental work were shown to be essentially similar in nature, and the chief techniques for measuring efficiency at work were outlined. This was followed by a study of work-curve phenomena and the problem of fatigue, or, stated more exactly, the physiological cost of work. The effects of work on the body were found to result in certain deleterious metabolic changes as well as other disturbances interfering with optimal performance.

Since the satisfaction and personal welfare of the worker are important outcomes of work, they must be included in the numerator of the efficiency equation. Thus the problem of the hygiene of work becomes important on humanitarian grounds as well as economic. Some of the conditions that are capable of manipulation to reduce the untoward effects of work were outlined. These include the proper use of rest pauses and the distribution of effort, the hygiene of the sense organs, especially those for sight, and the control of the worker's environment to provide optimal conditions of illumination and the surrounding atmosphere.

Inasmuch as experimental results are often contradictory to *a priori* expectations derived from more generalized experimentation, a section was devoted to certain psychological aspects of efficiency. The motives with which men go to work were found to be extremely important in the conditioning of efficiency, and certain principles were enumerated to guide the practical application of incentives. Distraction and boredom, too, were found to be motivational phenomena. Though certain conditions do in fact take a greater toll of human energy than others, performance does not necessarily suffer on that account. The extent to which it is possible to draw upon individuals' energy reserves through special motivation without threatening their health is at present an unanswered problem. A brief section at the close of the chapter emphasized the fact that much can be gained in efficiency through discovering and mastering good work habits and using tools that are ideally suited to the tasks to be performed.

RECOMMENDED SUPPLEMENTARY READINGS

- BILLS, A. G.: *The Psychology of Efficiency*, Harper & Brothers, New York, 1943.
BORING, E. G.: *Psychology for the Armed Services*, The Infantry Journal, Washington, 1945.
BURTT, H. E.: *Psychology and Industrial Efficiency*, D. Appleton-Century Company, Inc., New York, 1929.
GILBRETH, F. B., and GILBRETH, L. M.: *Fatigue Study*, The Macmillan Company, New York, 1919.

- GRAY, J. S. (Ed.): *Psychology in Use*, American Book Company, New York, 1941.
- HILL, A. V.: *Muscular Movement in Man*, McGraw-Hill Book Company, Inc., New York, 1927.
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- VITELES, M. S.: *Science of Work*, W. W. Norton & Company, Inc., 1934.

CHAPTER XVI

PSYCHOLOGY IN BUSINESS¹

- Advertising
 - Appeals
 - Factors of the Advertisement
 - Color
 - Size
 - Cuts and Illustrations
 - Headlines
 - Advertising Media
 - Newspapers
 - Magazines
 - Radio
 - Testing Advertisements
- Consumer Research
- Salesmanship
 - What the Salesman Does
 - Qualities of the Salesman
 - Rating Scales
 - Tests

In recent years no other field of applied psychology has been the cause of more interest and research than the field of business. Some of this research was chiefly theoretical, but more of it was practical. It centers around such practical problems as the most effective appeals, color, and size of advertisements; who the customers for a specific product are, and what kind of product they want and need; the mental ability and personal qualities of the successful and unsuccessful salesman.

ADVERTISING

Advertising in the United States has developed into an annual 2 billion dollar business. It has been estimated² that in 1937 the money spent for advertising was distributed among the various media as follows:

¹ This chapter was written by Martha Ann Blosser, Senior Psychological Tester, Pennsylvania State Council for the Blind, Department of Welfare.

² Rowse, E. J., and Fish, L. J., *Fundamentals of Advertising*, p. 20, South-Western Publishing Company, Inc., New York, 1937.

Newspaper.....	\$750,000,000
Magazines and trade papers.....	300,000,000
Streetcars.....	20,000,000
Billboards, posters, and electric signs.....	300,000,000
Novelties.....	50,000,000
Catalogues and other literature.....	950,000,000
Radio.....	60,000,000
Total.....	\$2,430,000,000

Expenditures for some typical national advertisers for 1943¹ were:

Brand	Newspaper	Magazine	Radio
Pepsodent	\$247,656	\$ 395,544	\$ 628,212
Lady Esther.....	269,347	142,522	598,410
Listerine.....	766,986	1,163,385	
Wheaties.....	151,642	164,421	1,430,139
Heinz.....	993,377	1,055,347	
Gillette Razor.....	322,895	133,280	45,079

These figures indicate the huge scale of modern advertising. The consequent need for scientific advertising methods is acute. Lack of psychological facts and statistics has been responsible for the failure of many advertising campaigns. For example, there is the case of the talcum powder magnate who "spent thousands of dollars on literature glorifying purity, smoothness, and antiseptic qualities. Then he made an investigation. Ninety-five out of every hundred women bought his powder because they like the odor. The other five bought because they liked the little can. . . . Still another advertiser spent hundreds of thousands of dollars telling about the healthful iron in raisins. When he began to investigate, he discovered his iron was appealing to only eight in every 100 of his actual customers. The other 92 were buying the raisins because they 'taste good'."²

That "it pays to advertise" is generally accepted; that it costs to advertise is shown by the preceding data. But advertising cost results in increased profits for business and increased savings for the consumer. A school principal, intelligent and well educated, was once heard to say that he didn't allow any nationally advertised product to be used in his home. By avoiding advertised brands, and therefore any advertising costs,³ this man believed he was buying

¹ Media Records, Inc., *Expenditures of National Advertisers*, American Newspaper Publishers Association, 1943.

² Goode, K., *Modern Advertising*, Greenberg, Publisher, Inc., New York, 1932.

³ The median expenditure on advertising of several large companies is 3 per cent of sales. Poffenberger (*Psychology in Advertising*, p. 49, McGraw-Hill Book

better quality for less money. In theory, at least, advertising, by increasing consumption, lowers production costs. "The ordinary, logical sequence is: The more a product is efficiently and truthfully advertised, the more it is consumed; the greater the quantity consumed, the greater the quantity produced; the greater the quantity produced, the lower the cost of production per unit."¹ For example, a certain clothing manufacturer was doing a business of \$3,500,000 yearly, with a selling expense equal to 8 per cent of total sales. He began a national advertising program, and in a few years his sales were \$14,000,000 annually, with a selling cost, including advertising, of 5 per cent. By spending \$10,000 for advertising, a retail shoe store increased annual sales from \$100,000 to \$168,000. They reduced the price of shoes 25 cents a pair, and at the same time made a slightly larger profit on each pair of shoes sold. Money spent for advertising benefits both producer and consumer.

APPEALS

The appeal to a human want is the basis of the advertisement. Generally, wants are divided into three classes: primary—those that are basic, unlearned, and individual; secondary—those that are learned, but are universally learned; and tertiary—those that are individual and idiocentric. For example, a want for food is a primary want; a want for steak is a secondary want; a want for steak smothered in onions is a tertiary want. (For a discussion of wants, see Chap. VI.)

The relative strength of appeals to various wants has been studied frequently. Table 159 shows reader reaction to a number of basic appeals.² In another study of the relative persuasiveness of appeals Hollingworth³ found that the 12 most persuasive were (in order)

Company, Inc., New York, 1932) lists the following:

Company	Per Cent of Sales Expended for Advertising
Arrow Collars	3.5
Champion Spark Plugs.	7.0
Colgate	2.0
Ivory	3.0
Old Dutch.	10.0
Packard.	1.1
Sears, Roebuck.	10.0

¹ Rowse, E. C., and Fish, L. J., *Fundamentals of Advertising*, p. 26, South-Western Publishing Company, Inc., New York 1937.

² Hepner, H. W., *Effective Advertising*, McGraw-Hill Book Company, Inc., New York, 1941, p. 163.

³ Hollingworth, H. L., *Advertising and Selling*, D. Appleton-Century Company, Inc., New York, 1925.

health, cleanliness, scientific, time saved, appetizing, efficiency, safety, durability, quality, modernity, and family affection. The results of a

TABLE 159.—REACTION OF SUNDAY NEWSPAPER READERS TO BASIC ADVERTISING THEMES

Copy appeal	Readers per inch	
	Men	Women
News features.....	653	1.007
Sex allure.....	377	1.027
Social advancement.....	476	.337
Narrative technique (both strip and straight copy).....	318	.695
Characters from the product's radio program.....	388	.541
Reason why copy.....	316	.563
Contests.....	162	.414
Testimonials.....	200	.356
Scare appeals.....	139	.407
Smartness and newness.....	271	.251
Health appeal.....	218	.272
Product's reaction under test..	276	.263
Price reductions and values	262	.167
Premiums.....	167	.256
Service given with product.....	083	.321
The product alone, with no drama	232	.073

TABLE 160.—RANK OF BASIC APPEALS

Appeal	Rank by advertisements	Rank by men	Rank by women
Economy	1	8	9
Efficiency	2	9	9
Emulation	3	4	4
Novelty	4	4	8
Quality ..	5	1	3
Fear... ..	6	3	6
Health	7	10	4
Ambition	8	7	7
Sex.....	9	2	1
Vanity... ..	9	6	2

survey by Gallup of the relative strength of basic appeals, determined by number of advertisements and by vote of readers, is shown in Table 160.¹ This study was based on the attention value of full-page

¹ Hotchkiss, G. B., *Outline of Advertising*, p. 189, The Macmillan Company.

black-and-white ads in four leading weekly magazines in 1931. The relative strength of appeals, as ranked by Starch,¹ is shown in Table 161. The way in which the appeal to a want is applied to an advertisement is illustrated by Allen² in Table 162.

TABLE 161.—RELATIVE STRENGTH OF MOTIVES

Motive	Per Cent
Appetite—hunger.....	9.2
Love of offspring.....	9.1
Health.....	9.0
Sex attraction.....	8.9
Parental affection.....	8.9
Ambition.....	8.6
Pleasure.....	8.6
Bodily comfort.....	8.4
Possession.....	8.4
Approval by others.....	8.0
Gregariousness.....	7.9
Taste.....	7.8
Personal appearance.....	7.8
Safety.....	7.8
Cleanliness.....	7.7
Rest—sleep.....	7.7
Home comfort.....	7.5
Economy.....	7.5
Curiosity.....	7.5
Efficiency.....	7.3
Competition.....	7.3
Cooperation.....	7.1
Respect for Deity.....	7.1

The effectiveness of these appeals is influenced by external conditions and by the product being advertised. In prosperous times, appeals to comfort and luxury rank higher than appeals to economy; in depression, the ranks are reversed. The age of the reader is a factor also. Appeals to the welfare of loved ones, or to sex, increase as children grow older. Occupation and social position of the reader also influence the effectiveness of appeals. (The advertisement "appeals to a motive that is caused by a want.") Although the motives of individuals differ, there are common characteristics. The best advertising

New York, 1933, quoting G. Gallup, "Factors of Reader Interest in 261 Advertisements" (Supplement to Survey of Reader Interest in *Saturday Evening Post, Liberty, Collier's, Literary Digest*).

¹ Starch, D., *Principles of Advertising*, p. 273, McGraw-Hill Book Company, Inc., New York, 1923.

² Allen, C. N., *A Psychology of Motivation for Advertisers*, *J. Appl. Psychol.*, 1941, 25, 378.

aims at the most common characteristics. The product is a chief consideration in determining the appeal. For instance, the health appeal is near the top of the lists in persuasiveness, yet beauty is a more effective appeal in the sale of mouth washes. For years Listerine used an appeal to health with only moderate success. By switching to the desire for social approval, with the halitosis campaign, sales increased rapidly. Formerly, bank advertising emphasized saving for security in old age; now such advertising stresses saving as a means to future pleasures, such as travel. Until recently, shoe manu-

TABLE 162.—EXAMPLES OF APPEALS USED IN ADVERTISING HEADLINES AND SLOGANS

Primary Wants	Appeals to Primary Wants
Appetizing food.....	"Meat on the Table"
Thirst-quenching drinks.....	"The Pause that Refreshes"
Comfortable surroundings.....	"See the kitchen 'Good Housekeeping' likes"
Escape from pain and danger....	"Feel that Knot of Pain fade away"
Sex companionship.....	"Cigars Needn't Interfere with Kisses"
Welfare of loved ones.....	"My Daddy's Smart" (Frequently used in insurance advertisements)
Social approval.....	"Now that's what I call good coffee"
Superiority over others.....	"How to win friends and influence people"
Mastery over obstacles.....	"Are you flying blind?" (I.C.S.)
Play.....	"Play Winter Sports in Winter Sportswear"
Secondary Wants	Appeals to Secondary Wants
Universality.....	"Around the corner from everywhere"
Health.....	"Join the 'Regulars' with Kellogg's All Bran"
Efficiency.....	"More Free Time for Mothers"
Convenience.....	"No Need to Shift or Use the Clutch"
Dependability, quality.....	"Strong as the Rock of Gibraltar"
Economy, profit.....	"Clipping this coupon saved him \$17.92"
Style, beauty.....	"Make your figure lovelier the easy way"
Cleanliness.....	"Banish 'Tattle-tale Grey'"
Curiosity.....	"What can a Man Believe In?"
Information, education.....	"What do you know about sheets?"

facturers stressed style and price in their advertisements. Then Bostonian Shoes found that most men are far more interested in comfort. Shoe advertising changed emphasis from style to feel. Here the two appeals are theoretically approximately equal in strength—yet the appeal to comfort is more effective than style in shoe advertising. The most powerful appeal for shaving cream was found to be "cool and refreshing." For study lamps, the strongest appeal is "reduction of eye strain," while "low price" was fifth, "beauty of design" sixth, and "quality of construction" seventh.¹ These data

¹ Sandage, C. H., *Advertising, Theory and Practice*, pp. 295-7, Business Publications, Inc., Chicago, 1926.

suggest that among the most powerful advertising appeals are sex, social advancement, vanity, ambition, quality, love of family, and health. In short, the appeal must suit the individual product. Lists of appeals are helpful, but an actual test of a specific appeal applied to a specific product is the most effective way of selecting the advertising appeal.

FACTORS OF THE ADVERTISEMENT

The individual parts of the advertisement—illustrations, copy, type, color, headlines, position, size, etc.—have been carefully studied and evaluated.

Color.—In a Sears, Roebuck and Company catalogue there were two pages of skirt ads, one in color, the other in black and white. The style, quality, and price were identical. The colored page drew ten times more returns than the black-and-white.¹ Face powder in a blue box sells quicker than that in a green; tan cars are more popular in the West, black in the East; green is the most popular color for fountain pens; “white eggs in a blue box sell 30 per cent faster” than in a box of any other color; sales for Woodbury soap increased when the wrapper was changed from green and ivory to blue.² Color is assumed to be even more important in advertisements of products such as wallpaper and paint, linoleum, title, bath towels—products in which color is an intrinsic part of the goods.

Generally, a color ad costs about one-third more than a black-and-white ad and sells approximately twice as much.³ A comparison of rates for colored and black-and-white ads (from the *Saturday Evening Post*, circulation at that time 3,100,000) shows that a four-color page sold for \$11,500; a black-and-white page, for \$8,000; fourth cover in four colors, \$15,000.⁴ For every 100 people who see a black-and-white ad, there are 165 who see a four-color advertisement.

Color preferences are influenced by culture and by age. The Chinese like red, but blue is lacking in favor; Africans like blue (to them, a symbol of peace) and dislike red, which they believe symbolizes war. A young child prefers red, blue, white, green, and brown, in that order. The most popular color with London school children is blue, followed by red, yellow, and green. Vassar college students

¹ Starch, *op. cit.*, p. 583.

² Color for Sales, *Modern Packaging*, April, 1938.

³ Goode, K. M., *Modern Advertising Makes Money*, p. 161, Harper & Brothers, New York, 1934.

⁴ Hepner, *op. cit.*, p. 471.

prefer blue, red, green, yellow, and orange. A comparison of the color likes and dislikes of men and women is shown in Table 163.¹

The Union Trust Company of Detroit tested the color preference for booklets by having one booklet printed in ten different colors.

TABLE 163.—COLOR PREFERENCES OF MEN AND WOMEN

Color	Per cent of men who like it	Per cent of men who dislike it	Per cent of women who like it	Per cent of women who dislike it
Red	22	7	42	8
Orange.....	5	25	8	31
Yellow.....	2	32	5	8
Green.....	7	15	9	21
Blue.....	42	12	9	23
Violet.....	19	8	19	9
White.....	3	1	8	0

Booklets of each color were on display in the lobby of the bank for 14 days. The color of the booklet was the only variable. The number of booklets of each color taken is shown in Fig. 68.

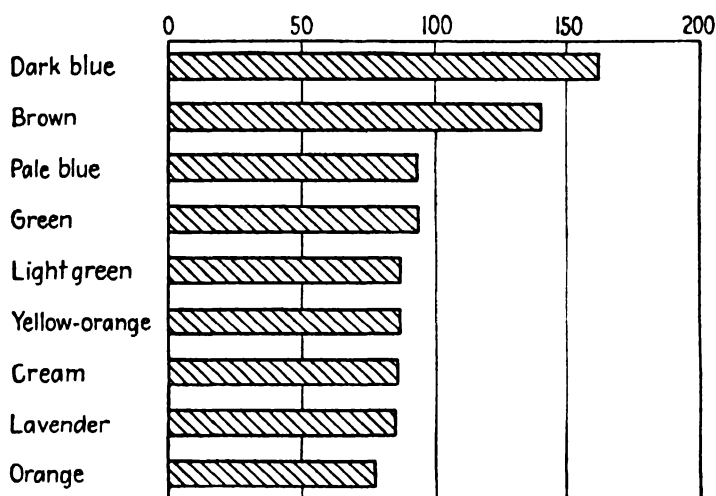


FIG. 68.—Number of various colored booklets selected. (From Hepner, *op. cit.*, p. 464.)

Color is used chiefly because of its attention value. It also aids in the recognition of trade-mark or package, gives a better picture of the style and texture of the product, and conveys an attitude or emotion.²

¹ Wissler's table, as quoted in Hollingworth, *op. cit.*, p. 101.

² The meanings of colors, as given in *Color for Sales, Modern Packaging*, April,

Size.—Does a large advertisement receive more attention than a small one? Is the attention value in direct proportion to the size? Are several small ads more effective than one large ad? The most comprehensive study of the problem of size was made by Starch,¹

TABLE 164.—RELATION OF SIZE OF ADVERTISEMENT TO INQUIRIES RECEIVED

Size of space	Size ratio	Number of replies per 100,000
Full page.....	100	225.3
Half page.....	50	120.4
Quarter page.....	25	71.8
Sixth page.....	17	38.9

TABLE 165.—RELATION OF SIZE OF ADVERTISEMENT TO ATTENTION VALUE

Average size in column	Number of advertisements	Size ratios	Experimental attention ratios	Theoretical attention ratios
3.4 inches.....	22	1.00	1.00	1.00
7.6 inches.....	17	2.24	1.48	1.49
14.4 inches.....	17	4.25	1.83	2.06
22.7 inches.....	13	6.70	2.10	2.58

using the inquiries received by 98 companies from 2,339 magazine advertisements. Table 164 summarizes his results. From this evidence Starch concluded that “. . . advertisements brought replies very nearly in proportion to their size, although the smaller sizes had a slight advantage.”

1938, p. 30, are

Color	Meaning
Red.....	Fire, heat, excitement, strength
Orange.....	Warmth, power, action, tastiness
Maroon.....	Richness, solidity, luxury, quietness
Yellow.....	Brightness, airiness, refreshment
Dark blue.....	Coldness, formality, depth, haughtiness
Light blue.....	Coolness, fragility, daintiness, youthfulness
Light green.....	Freshness, crispness, coolness
Purple.....	Royalty, stateliness, opulence
Gray.....	Mildness, softness, reserve, primness
White.....	Purity, professionalism, cleanliness
Black.....	Strength, mystery, heaviness, coldness

¹ Starch, D., *An Analysis of Over 3,000,000 Inquiries Received by 98 Firms from 2,339 Magazine Advertisements*, quoted by Hepner, *op. cit.*, p. 366.

In a study of the relationship of attention value and size of advertisements in the *New York Times*, Franken¹ found the results shown in Table 165. The square-root theory, first suggested by Hollingworth, is used to determine the theoretical ratio. Hollingworth explained it: "The number of inquiries tends to increase as the square root of the amount of space used. That is to say, use four times the space and you double the returns; use nine times the space and you treble the returns." For example, if a quarter-page ad received 100 replies, a full-page ad would receive 200 replies; if inquiries were in direct proportion to the size of the ad, and a quarter-page ad drew 100 replies, a full-page advertisement would receive 400 replies. The larger advertisement draws more attention than the smaller, but the attention is not in direct proportion to the size of the advertisements.

Cuts and Illustrations.—The chief purposes of illustrations have been listed as follows:²

1. To attract attention
2. To beautify the advertisement
3. To direct attention toward the product
4. To suggest a story
5. To enforce and supplement the text
6. To show the appearance of the product
7. To show the use of the article
8. To appeal to the instincts or emotions
9. To dramatize the use of the product

The type of picture used is regulated by its purpose in the advertisement. The results of a survey³ show that advertisements without pictures averaged 83 per cent less attraction for women, and 44 per cent less for men, than did those advertisements with pictures. When a soap manufacturer ran a picture of a baby in six women's magazines and offered the picture, "suitable for framing," upon request, there were 235,000 replies.⁴ A famous example of the effectiveness of a cut is shown by an independent corporation full-page ad of several years ago.⁵ When the advertisement, for a memory course, was set in 8-point type, the sales cost was \$1.50 to \$2.25. By adding a small cut and using 6-point type, the sales cost was reduced to \$1.00. The

¹ Franken, R. B., as quoted by Hotchkiss, *op. cit.*, p. 170.

² Rowse and Fish, *op. cit.*, pp. 156 ff.

³ Blumberg, R., and Rheinstrom, C., How Advertising Techniques are Rated by Gallup Survey, *Printer's Ink*, March 24, 1932, pp. 117 ff.

⁴ Burt, H. E., *Psychology of Advertising*, p. 270, Houghton Mifflin Company, Boston, 1938.

⁵ Rheinstrom, C., *Keyed Copy, Advertising and Selling*, March 7, 1928.

rotogravure section of the Sunday newspaper, made up almost entirely of pictures, is read by 90 per cent of the people getting the paper—a figure unequalled by any other section of the paper.¹

Pictures of people draw more attention than pictures of objects. In one study, with outdoor poster boards as media, 67 pictures of people were recalled, compared with 39 pictures of objects; 48 pictures of people were recognized, compared with 37 pictures of objects.² Readers of Sunday Rotogravures prefer pictures of children, then, in order, photographs of groups of adults, sports scenes, animals, and natural scenery.³ Pictures irrelevant to the product being advertised draw more attention, but relevant pictures increase the memory value for the article or trade name being advertised. For example, a soap manufacturer used three different pictures in an advertising campaign—the first, completely irrelevant; the second, partially irrelevant; the third, relevant. The cost of the ad for every 1,000 women who saw it and knew the brand of soap advertised was⁴

For the irrelevant ad	\$34 85
For the partially irrelevant	26.60
For the relevant.	7 10

Headlines.—The headline, called the “most important part of an advertisement,”⁵ is an introduction to the rest of the advertisement. “The best headlines are those that appeal to the reader’s self-interest—headlines that offer the reader something he wants.” Examples are

Another \$50 Raise
Quit Work at 55

The next best type of headline gives news, such as

New features of the Ford truck
New Frigidaire gives you Hydrator

Another type of headline arouses curiosity.

Lost: \$35,000
Are you playing fair with your wife

Types of headlines, classed according to function by Glim,⁶ include

¹ Hepner, *op. cit.*, p. 398.

² Burt, *op. cit.*, p. 271.

³ Survey of Gallup Research Bureau, reported in Hepner, *op. cit.*, p. 398.

⁴ Hepner, *op. cit.*, p. 401.

⁵ Caples, J., *Tested Advertising Methods*, p. 13, Harper & Brothers, New York, 1932.

⁶ Glim, A., 3 Types of Headline Exist, *Printer's Ink*, April 9, 1931, p. 12

1. Label headlines—state the name of the article or summarize the copy.

Examples:

TEA to Tempt an Empress
Hay Fever

2. Message headlines—give information, often the article's main selling point.

Examples:

Cash for Old Coins
Give Your Face That "Air-Conditioned" Feeling

3. Provocative headlines—novel, stimulate the reader without revealing the copy.

Examples:

How high is an 8-foot fence?
It'll Lead You Astray—and You'll Like It

TABLE 166.—RELATION OF TITLE TO YEARLY SALES OF THE "LITTLE BLUE BOOKS"

Old title	Sales	New title	Sales
1. Ten O'Clock.....	2,000	1. What Art Should Mean to You.....	9,000
2. Pen, Pencil, and Poison...	5,000	2. The Story of a Notorious Criminal.....	15,800
3. Fleece of Gold.	6,000	3. Quest for a Blond Mistress	50,000
4. The Mystery of the Iron Mask.....	11,000	4. The Mystery of the Man in the Iron Mask.....	30,000
5. "Patent Medicine" and the Public Health.....	3,000	5. The Truth about "Patent Medicine".....	10,000
6. Addison and His Times...		6. London Life in Addison's Time.	7,000
7. Art of Controversy.....		7. How to Argue Logically	30,000
8. Life of Tolstoy.	2,500	8. Life of Tolstoy: Russian Novelist.....	6,500
9. Essay on Shelley.....	2,000	9. Shelley: Idealistic Dreamer.....	8,000
10. Casanova and His Loves..	8,000	10. Casanova: History's Greatest Lover.	22,000
11. Poems of Evolution.....	2,000	11. When You Were a Tadpole and I Was a Fish.....	7,000
12. Apothegems.....	2,000	12. Terse Truths about the Riddle of Life.....	9,000

4. Others—headlines which do not fall into the three preceding classifications, such as the question headline (Wouldn't You Spend a Dollar on a Good Book?) or the selective headline (To All Housewives).

The drawing power of book titles, similar in form to headlines, is shown by an analysis of the sales of "The Little Blue Books." These books sold for a nickel each and were advertised in leading magazines by title only, with no other description. Results of the change of title upon sales are shown in Table 166, compiled by E. Haldeman-Julius, the publisher.¹ Mr. Haldeman-Julius found the strongest appeals for his books were (1) sex, (2) self-education and improvement, (3) free thought or skepticism, and (4) entertainment or fun.

TABLE 167.—RELATION BETWEEN PAGE TRAFFIC AND EDITORIAL CONTENT OF PAGE

Page	Editorial content	Page traffic, per cent	
		Men	Women
1	Front page	95	87
2	News	72	63
6	Advertising	38	45
8	Radio	61	55
10	News	64	30
11	Full-page advertisement	60	57
12	Women's features	10	67
17	Sport	70	13
21	Features	90	84
22	Editorial	74	59
23	Opposite editorial	74	64
24	Theater and movies	52	52
26	Business	27	2
31	Classified	3	12
33	Comics	59	66
34	News	59	72

ADVERTISING MEDIA

Newspapers.—"The newspaper is read universally" by all classes and groups. It is especially effective when the advertising is directed to one locality. Newspaper advertisements are timely—the copy can be changed daily, the sales are immediate. The newspaper is an excellent medium for testing an advertisement.² Financially, advertising is the most important part of the newspaper. A paper selling for 2 cents on the street costs the publisher from 10 to 14 cents. Advertising revenue makes up the difference.

An analysis of the page traffic and the editorial content of the page

¹ Haldeman-Julius, E., *The First Hundred Million*, Simon & Schuster, Inc., New York, 1928.

² Rowse and Fish, *op. cit.*, p. 233; Hotchkiss, *op. cit.*, p. 364.

was made by Kimberly-Clark Corporation.¹ Parts of the study are shown in Table 167. From these and other data Hepner concludes that the preferred positions for advertising in a newspaper are (1) front and editorial pages, if advertising is permitted there; (2) back page; (3) double-page spread in the center; (4) position next to news or other reading material.

Wiseman summarized newspaper advertising as follows:

The newspaper is a local medium, its editorial content is ephemeral (most of it is "dead" within an hour), reading time is limited to a few minutes, the readers of its advertisements are seeking news about merchandise and prices, and their interest must be engaged at first glance or be lost forever. Studies of newspaper readership reports show that, to get economical attention and reading, newspaper advertisements need not be pretty, or large, or tricky; and that, aside from "shopping lists," those which get the highest amount of attention and reading are usually informal, open, even seemingly amateurish. They display price when possible. They contain news headlines. Their texts, while not necessarily short, are written in news style with the essential information in the first few words. . . . Their appeals are made quickly to primary buying motives: money-saving, style, newness.²

TABLE 168.—COST OF MAGAZINE SPACE (APRIL, 1940)

Publication	Circulation, in thousands	Basic page rate	Rate per page per thousand
Saturday Evening Post.....	2,700	\$8,000	\$ 2.96
Collier's.....	2,500	6,500	2.60
Liberty.....	2,300	4,600	2.00
Life.....	2,000	6,550	3.28
Time.....	700	2,475	3.54
American.....	2,050	5,000	2.44
National Geographic.....	1,000	3,000	3.00
Ladies' Home Journal.....	2,800	8,500	3.04
Esquire.....	450	2,950	6.56
Fortune.....	130	1,400	10.77
The Poultryman.....	10	163.50	16.35
Christian Advocate ..	13	65	3.61

Magazines.—Magazines are classed in two groups—general and business. There are approximately 600 general magazines—magazines of universal appeal such as *The Saturday Evening Post*, *The Readers Digest*, and *Time*. Also classified under general magazines

¹ As reported in Hepner, *op. cit.*, p. 236.

² Wiseman, M., Why "National Advertising Copy"? *Advertising and Selling*, January, 1941, p. 21.

are those specialized in regard to age, sex, and interests, such as *Vogue*, *Ladies' Home Journal*, *American Boy*, and *Popular Mechanics*. There are approximately 1,500 business publications, including industrial periodicals, trade or commercial periodicals, service and professional periodicals, catalogues and data books.¹ The advertisements in business publications are technical and specific. Page rates run from \$100 to \$200. Other magazine advertising rates are shown in Table 168.²

Advantages of magazine advertising over that in newspapers include

1. Better display facilities—variety of color and typography.
2. Magazines have a comparatively long life—a magazine ad may draw results long after it has been published.
3. Magazines have a greater prestige than newspapers.

Disadvantages of magazine advertising are:

1. Magazine advertisements are inflexible and must be contracted for and planned months before publication.
2. They are costly, averaging from \$5,000 to \$10,000 a page.
3. It is a disadvantage for the advertiser who does not need national coverage.

Radio.—Radio is the advertising medium most rapidly increasing in importance. In 1940, customers in the United States spent a total of \$750,000,000 in order to listen to their radios. A count of 122,000 people in 10 cities showed that 27.8 per cent of them listened to the radio 6 hours or more a day; 59.7 per cent listened 4 or more hours; 91.0 per cent listened 2 or more hours a day; 99.0 per cent listened at least 1 hour a day.³ Eight to 9:00 P.M. is the most popular hour for listening to the radio—47.4 per cent of urban radios are in use then. The next most popular hours are 9:00 to 10:00 and 7:00 to 8:00 P.M. The most popular radio hour of the week is Sunday from 8:00 until 9:00 P.M. The percentage of radio time devoted to each type of program is shown in Table 169.⁴ (These results are based on the programs of one week heard on stations affiliated with the Columbia Broadcasting System.) Popular music and dramatic programs account for 49 per cent of radio time, commercials for 5 per cent.

Radio advertising is more direct and more personal than most

¹ Hanford, M. P., *Advertising and Selling Through Business Publications*, Chap. 2, Harper & Brothers, New York, 1938.

² Hepner, *op. cit.*, p. 271.

³ Goode, K., *Modern Advertising Makes Money*, p. 119, Harper & Brothers, New York, 1934.

⁴ Burt, *op. cit.*, p. 395.

types of advertising. Cantril and Allport¹ found that people remember directions, sentences, numbers, advertising trade-marks, facts, and abstract material better when they are heard over the radio than when they are read. On the other hand, radio is an expensive medium—a coast-to-coast broadcast costs from \$10,000 to \$15,000 an hour for

TABLE 169.—PERCENTAGE OF TIME DEVOTED TO VARIOUS TYPES OF RADIO PROGRAMS

Program	Per Cent of Total Time
Musical:	
Popular.....	36
Light.....	8
Classical.....	8
Semiclassical.....	5
Novelty.....	3
Religious.....	1
Nonmusical:	
Script (dramatic, dialogue).....	13
Announcements of program content...	6
Commercial announcements.	5
Educational.....	5
Special events.	4
Functions.....	3
Political.....	1
Church programs.....	1
Humorous.....	1

time, in addition to costs of production and talent. Hepner concludes that radio is best adapted to advertising products of "frequent purchase and rapid consumption."

Other advertising media include direct mail, billboards, posters, electric signs, novelties, catalogues, displays, and exhibits.

TESTING ADVERTISEMENTS

Among the various methods of testing advertisements are:

1. Preliminary sales tests: several ads or samples from proposed advertising campaigns are used in a limited area and measured in terms of effect on sales (also called spot testing).
2. Measurement by the direct rise in sales; only practical in testing effectiveness of a mail-order catalogue, window display, etc.
3. Coupon or inquiry tests: effectiveness of ad is measured by the number of inquiries received. An average black-and-white full-page advertisement will receive 225 replies for every 100,000 circulation.

¹ Cantril, H., and Allport, G. W., *The Psychology of Radio*, Harper & Brothers, New York, 1935.

The correlation between inquiries and sales has not been definitely established, although it is estimated that one-third of those who inquire eventually buy.

4. Consumer attitude survey: based on questionnaires that measure the effectiveness of one company's advertising program in comparison with competitors.

5. Consumer jury tests: a proposed advertisement is submitted to a selected group, whose reactions are assumed to be typical of the general reaction.

6. Unaided recall test: measures whether or not an advertisement is remembered. Ineffective because the ads that are remembered are frequently not the ones that influence people to buy.

7. Aided recall test: the commodity name is furnished, and the subject is asked to furnish the brand name. This method is used extensively in laboratory tests.

8. Recognition test: the individual is shown a newspaper or magazine, which he has seen previously, and is asked to go through it, showing the tester all that he remembers seeing when reading the paper the first time.

TABLE 170.—PERCENTAGE OF TRIALS IN WHICH ADVERTISING CLUBS CORRECTLY SELECTED THE MORE EFFECTIVE OF TWO ADVERTISEMENTS

Club	Percentage
<i>A</i>	72
<i>B</i>	72
<i>C</i>	72
<i>D</i>	63
<i>E</i>	63
<i>F</i>	63
<i>G</i>	63
<i>H</i>	54
<i>I</i>	54
<i>J</i>	54
<i>K</i>	54
<i>L</i>	54
<i>M</i>	54
<i>N</i>	45
<i>O</i>	27

We cannot guess which of two advertisements will be more effective. Even expert advertising consultants often cannot select the better of two advertisements. Goode and Rheinstrom¹ selected 11 pairs of advertisements, each pair being for the same product and having been used under similar conditions. These advertisements had been meas-

¹ Goode, K., and Rheinstrom, C., *More Profits from Advertising*, p. 5, Harper & Brothers, New York, 1931.

ured for effectiveness by a number of inquiries and sales. Members of 15 advertising clubs throughout the country were asked to choose the better advertisement from each pair. Using the actual effectiveness as a criterion, the percentage of correct guesses is shown in Table 170. The average percentage correct was 57.6—slightly better than the average would have been by flipping a coin.

TABLE 171.—BRANDS THAT HAVE MENTAL DOMINANCE WITH THE PUBLIC
(Figures based on answers of 500 men and 500 women)

Commodity	Brand	Men	Women	Total
Cameras.....	Eastman	461	419	880
Sewing machines.....	Singer	409	362	771
Soup.....	Campbell	360	397	757
Collars.....	Arrow	421	327	748
Fountain pens.....	Waterman	413	333	746
Coffee substitutes.....	Postum	360	385	745
Cleanser.....	Old Dutch	342	402	744
Chewing gum.....	Wrigley	378	286	664
Crackers.....	National Biscuit	367	295	662
Grape juice.....	Welch	335	279	614
Tooth brush.....	Prophylactic	270	305	575
Motorcycles.....	Indian	334	230	564
Tooth paste.....	Colgate	266	273	539
Rubber heels.....	O'Sullivan	359	170	529
Cocoa.....	Baker's	275	245	520
Silverware.....	Rogers	264	247	511
Baking powder.....	Royal	246	263	509
Baked beans.....	Heinz	234	265	499
Beer substitutes.....	Bevo	336	157	493

An outstanding example of thoroughness and completeness in testing advertisements is the study made by Hotchkiss and Franken,¹ of the leadership of advertised brands. They found that dominant brands have common characteristics: all have been on the market a long time and were pioneers in their fields; most of them are widely advertised; each was probably the largest seller in its field; nearly all are used frequently; all were products of standard quality and good reputation. Commodities showing a high degree of brand familiarity include chewing gum, automobiles, soap, baked beans, watches, soup, tooth paste, sewing machines, fountain pens, breakfast food, etc. Commodities below average in brand familiarity include lace curtains,

¹ Hotchkiss, G. B., and Franken, R. B., *The Leadership of Advertised Brands*, Doubleday & Company, Inc., New York, 1923.

ribbon, umbrellas, rice, leather goods, neckties, handkerchiefs, jewelry (see Table 171).¹

Analysis of brand leadership by commodities was also studied by Hotchkiss. For example, he found over 20 different brands of baked beans mentioned.

Brand	Total Mentioned
Heinz	499
Van Camp	178
Campbell	173
Libby	8
Miscellaneous brands	23
Names apparently not brands (<i>e.g.</i> , Boston)	79
Blanks	64
	<hr/> 1024

By studying the reasons given for responses in a brand-dominance test, Geissler² found that at least 50 per cent of the original causes of use were traceable to advertising.

Well-known trade-marks have the same characteristics as well-known brand names—they are extensively advertised, have been on the market a long time, and are frequently used. Hotchkiss³ interviewed 2,238 people, then ranked trade-marks according to memory value, based on the percentage of interviewees who identified the trade-mark correctly (see Table 172). This survey divided the men into two groups, white-collar workers and working men, and the women into housewives and working women. White-collar workers were more familiar with all trade-marks than were working men. There was a smaller difference between housewives and working women—housewives scored higher on food and soap products; working women on cars, rubber, etc. Age and sex differences were slight. These studies are typical of many that have been made to discover the attention value and the memory value of advertisements and of dominant brands.

But effectiveness of advertising should be judged, not on attention or memory value alone, but also on ability of the advertisement to get people to buy the product. Link wrote, "Not what people think, or think they think, but what they actually do about certain advertisements is the important question." The attention and persuasion power of food advertisements was studied by Starch.⁴ See Table 173.

¹ Hotchkiss, *op. cit.*, pp. 113–114.

² Geissler, L. R., *Association Reactions Applied to Ideas of Commercial Brands of Familiar Articles*, *J. Appl. Psychol.*, 1917, 1, 275.

³ Hotchkiss, *op. cit.*, p. 214.

⁴ Starch, *op. cit.*, p. 404.

Laird¹ found that "there is a discrepancy between brand name recalled and brand used, or between association reaction and use. . . . There is

TABLE 172.—PERCENTAGE OF 2,238 PEOPLE WHO CORRECTLY IDENTIFIED TRADE-MARKS

Brand	Identified Correctly By:
Cadillac.....	75.2
Maxwell House Coffee.....	91.0
Mobiloil.....	40.5
Hartford Insurance.....	15.9
Walter Baker.....	81.5
Old Dutch Cleanser.....	93.5
Goodyear.....	46.9
Prudential Insurance.....	75.2
Bon Ami.....	75.4
Texaco.....	69.7
Bell Telephone.....	88.3
Fisher Body.....	80.1
Campbell's.....	68.8
Wrigley.....	80.9
Sherwin-Williams.....	46.6
Jantzen.....	77.1
Paramount.....	46.5
Cream of Wheat..	54.9
Swift.....	32.0
Arm and Hammer Baking Soda.....	55.3
Plymouth.....	27.3
Corn products.....	57.2
Quaker products.....	70.9
Chase Brass.....	7.9
Hart, Schaffner, & Marx.....	35.9

TABLE 173.—ATTENTION AND PERSUASION VALUE OF FOOD ADVERTISEMENTS

Brand	Attention test	Persuasion test
Cream of wheat	1.87	3.40
Beech-Nut ..	2.11	3.06
Aunt Jemima ..	3.26	3.02
Campbell's..	4.03	3.91
Penick's.....	4.60	4.49
Fleischman's.....	5.31	5.23

agreement in 58.2 per cent of the cases and disagreement in 41.8 per cent of the cases." Many people who name one brand on an association test do not actually use that brand.

¹ Laird, D. A., Critique of the Association Test as Applied to Advertisements. *J. Exp. Psychol.*, 1923, 6, 357

There is as yet no valid, reliable method of testing to determine what is good advertising—what advertising leads to most sales. Link¹ concludes: "The attempts to measure the effectiveness of the critical elements in advertising must be regarded as probably a hopeless task."

CONSUMER RESEARCH

In a message to stockholders, Alfred P. Sloan, Jr., president of General Motors, emphasized the importance of consumer research as follows:

As a result of large-scale operations and world-wide distribution, producer and consumer have become more and more widely separated, so that the matter of keeping a business sensitively in tune with the requirements of the ultimate consumer becomes a matter of increasing importance.

Through Consumer Research, General Motors aims to bridge this gap.²

The size and complexity of modern business result in an ever-increasing distance between manufacturer and consumer. Consumer research is the producers' method of keeping in touch with the wants and needs of the customers.³

Strong⁴ suggests that the following topics be considered in a consumer analysis:

1. Who is the customer? the potential customer?
 - a. Location
 - b. Characteristics—income, social class, age, sex, occupation, education, nationality, religion
 - c. Buying habits—frequency of purchase, amount purchased, when purchased, use of trade name in purchase, relation of price to consumption
2. Why people buy
 - a. Wants which product satisfies and uses of product
 - b. How are the wants satisfied without the purchase of the product
 - c. Factors preventing sales—products and services rendered by competitors, lack of income
3. Location of most advantageous markets

¹ Link, H. C., *The New Psychology of Selling and Advertising*, p. 79, The Macmillan Company, New York, 1932.

² Brown, L. O., *Market Research and Analysis*, p. 452, The Ronald Press Company, New York, 1937.

³ "Consumer research will uncover fundamental human desires. Product analysis will provide a basis for shaping the product to harmonize with existing human desires. Market analysis will locate and measure the ability of consumers to buy the product." Sandage, C. H., *Advertising*, p. 126, Business Publications, Inc., Chicago, 1936.

⁴ Strong, E. K., *Psychological Aspects of Business*, pp. 177-178, McGraw-Hill Book Company, Inc., New York, 1938.

There are numerous methods of securing information about customers—who and where they are, and why they buy. Printed material—i.e., books, trade papers, magazines, statistical bureaus, government publications—is a convenient and inexpensive source.

One of the most popular methods is the printed *questionnaire*, which is mailed to the consumer. The letter accompanying the questionnaire should be short and courteous, should tell why the information is desired, and should request the consumer to fill in the questionnaire and return it. The questionnaire should be brief, logical, unbiased, easily understandable, with no opportunity for ambiguity, and easy to answer. Another method of securing data about the consumer is through *personal interview*. This method is more expensive but results include comments and suggestions of the consumer.

The consumer survey and analysis should follow the general scientific-method steps outlined in Chap. VI. The steps used by the Psychological Corporation of New York to make a survey are quite similar.¹

1. A definite formulating of the problem
2. Preparing the questionnaire
3. Forecasting the manner in which the information obtained by the questionnaire would be tabulated and used
4. Trying out and revising the questionnaire
5. Executing a complete but limited *test tube* survey
6. Deciding on the scope and statistical distribution if an extensive study is warranted
7. The conclusions and preparation of a report

White² suggests the following outline for a consumer survey:

1. A written explanation of the scope and purpose of the survey
2. Selection of the executive and assistants to be responsible
3. "Creation of an analysis outline"
4. Internal survey, using available company records
5. Biographical work—investigating pertinent printed material
6. Determination of facts to be obtained through field work
7. Choice of method of field work to be used—that is, personal interviewer, mail questionnaire, field test, etc.
8. Selection of representative part of the market to be covered in the field work
9. "Formulation and testing questionnaires"
10. Actual field work—completion of biographical work
11. Edit and tabulate returns

¹ Link, *op. cit.*, pp. 66–67.

² White, P., *Market Research Technique*, p. 64, Harper & Brothers, New York, 1931.

12. Analyze data and draw conclusions
13. Test conclusions
14. Write report and present conclusions

Agencies doing consumer research are classified by the United States Department of Commerce as follows:

- Federal government
- State governments
- Colleges, universities, and foundations
- Publishers of books and trade directories
- Commercial organizations
 - Advertising agencies
 - Business services
 - Chambers of commerce
 - Cooperative marketing associations
 - Individual businesses
 - Magazines and newspapers
 - Trade associations

Typical of large corporations who maintain their own consumer research departments are Eastman Kodak, General Electric Company, General Motors Corporation, Metropolitan Life Insurance Company, Swift and Company.

A summary of an investigation of a nationally distributed product—raisins—will show some of the values of consumer research.¹ Sample questions were:

- Do you buy raisins in bulk or package?
- In what ways do you use raisins?
- What do you like most about raisins?
- With what brands of raisins are you familiar?

Seven hundred and fifty Boston housewives took part in the survey. (For a national survey, investigations should be carried on in six to ten typical sections of the country. An adequate and reliable sampling has been obtained only when the results are not changed by adding more cases.) Answers to the questionnaires were tabulated and commented on. Some of the conclusions of this survey were:

- Raisins are bought almost entirely in package form.
- Brand names are well established. (Nearly 60 per cent of sales were Sun-Maid.)
- The average family uses 20 to 25 lb. a year.
- There is considerable seasonal difference in sales.
- Raisins are most frequently used for puddings, cakes, and pies.

¹ Starch, *op. cit.*, Chap. 8.

Thirty-five per cent of the housewives used more raisins than they did the year before.

Strongest appeals were:

"Taste good"

"Make delicious dishes"

"High food value"

"Good for health"

Weakest appeals, in order, were:

"Contain iron"

"Easily digested"

"Relieve fatigue"

"A beauty food"

The value of such facts to the raisin industry is obvious.

An example of a study of the buying habits of people is the Milwaukee Consumer Analysis, made by the Milwaukee Journal from 1922 to 1931. The investigation included 60 types of groceries (including hundreds of brand names), toilet preparations such as tooth paste and

TABLE 174.—MARKET ANALYSIS USED TO SET THE SELLING PRICE OF SOAP

Selling price per cake	Number of cakes sold	Total sales made	Cost of goods	Gross profit	Variable expense	Fixed expense	Net
\$.10	600	\$60.00	\$40 00	\$20.00	\$3.60	\$10.00	\$6.40
.09	800	72.00	48 00	24.00	4.32	10.00	9 68
.08	1200	96.00	66.00	30.00	5.76	10.00	14 24
.07	1300	91 00	71 50	19.50	5 46	10 00	4 04

soap, automobiles and accessories, homes and building materials, tobacco, and miscellaneous products. Typical facts found in this survey were as follows:

From 1927 to 1931, there was a 17.6 per cent increase in the use of packaged coffee. Eight O'Clock coffee was the most popular brand. There was a gradual decline in the uses of coffee substitutes.

From 1930 to 1931, the use of corn breakfast foods increased 5.1 per cent, while wheat foods fell off 2.1 per cent. Kellogg's Corn Flakes was the most popular corn cereal, and Cream of Wheat the first wheat food.

Cigarettes grew increasingly popular from 1922 to 1931. Lucky Strike displaced Camels as the favorite brand—39.2 per cent to 36 per cent.

Tooth paste was used by 95.9 per cent of the families. Pepsodent was the most popular brand and was used by 29 per cent of the families. Colgate and Listerine followed in popularity.

The two surveys reviewed above were general and resulted in many

facts about the products being investigated. Consumer surveys are also used to determine the answer to one specific question about one product. This type of survey,¹ summarized in Table 174, was used to set the selling price of a brand of soap.²

Obviously, consumer research contributes to business success by³ keeping the business in touch with the customers; improving marketing methods; developing new sources of profits by discovering new products and new markets; avoiding unanticipated changes that may make a product obsolete. Market analysis is used to determine who buys the product, why they buy, who uses the product, shopping habits, brand preference, how much can be sold, type of product that should be produced—design, size, shape, etc., and to determine future trends and conditions by studying past conditions. These values of market research support the statement that “in the coming business era, scientific methods will be applied to distribution as they were to production in the past era.”⁴

SALESMANSHIP

Twenty years ago Henry A. Lampman, then president of the American Salesmen's Association, Inc., wrote, “The ‘Art and Science of Selling’ is far from being as exact a science as engineering or chemistry.” As yet, there is no science of selling, but, rather, there are many theories of selling. Increasing interest in this field is indicated by the number of books published concerning salesmen and the process of selling. The first book appeared in 1869. By 1910 a total of 47 books on selling had been published; by 1930 there were 561; in 1940 the books on selling and salesmanship numbered 886. In 1940 there were between 4 and 6 million salespeople in the United States. Sales for 1939 of the 1,770,355 retail stores in this country amounted to \$42,041-790,000. As salesmanship becomes increasingly important, facts are replacing ideas, and data are replacing theories.

There are numerous definitions of selling and salesmanship. The following are typical:

¹ “Market research is the scientific study of markets or marketing methods in a broad general way. Market analysis, on the other hand, is the scientific study of the markets and marketing methods for a specific product or service, the results of which are to be used as the basis for the policies, plans, and operations of an individual firm.” Brown, *op. cit.*, p. 12.

² *Drug Trade News*, May, 1932, p. 31.

³ Brown, *op. cit.*, pp. 1-16.

⁴ White, P., *Market Analysis—Its Principles and Markets*, p. vii, McGraw-Hill, Book Company, Inc., New York, 1921.

Selling is the personal or impersonal process of assisting and/or persuading a prospective customer to buy a commodity or service or to act upon an idea.¹

Salesmanship is the process of making your firm's service clear to those who can use it and profit from it, and bringing them to act on that knowledge.²

Salesmanship is a *service* which should benefit the customer. The problem in the sales situation is the customer's problem. The salesman is a specialist in helping the customer solve such problems.

Salesmanship is the power to persuade people to do what they had not intended or wanted to do—with a resultant profit to them from so doing.³

Salesmanship is the art of persuading someone to agree to be exploited.

Selling is that division of marketing which has to do with all the numerous activities whereby those individuals or firms possessing goods capable of rendering services seek to influence others to trade with them. Personal selling is that in which the influence is exerted directly by salesmen or women. Salesmanship is a popular term used to designate the body of arts practiced by sellers in their attempt to influence others to buy.⁴

Salesmanship is the ability to persuade people to want what they already need.⁵

Salesmanship is the art of satisfying the need of a customer with goods and service, thereby establishing continuous and profitable relations between buyer and seller.⁶

With such variability among definitions, we must expect disagreement over the method or process of selling. The lack of standardization is pointed out by Bevan Lawson, executive sales manager for Dictaphone Sales Corporation: "Sales management itself has not yet standardized the requirements of salesmanship, and consequently no information on the selling process is available in teachable matter."⁷

WHAT THE SALESMAN DOES

In his book, *Modern Salesmanship*, endorsed and published under the direction of the American Salesmen's Association, Inc., J. George

¹ The Committee on Definitions of the National Association of Teachers of Marketing and Advertising.

² Frederick, J. G., *Modern Salesmanship*, p. 32, Henry Holt and Company, Inc., New York, 1925.

³ Barnhard, quoted by H. K. Nixon, *Principles of Selling*, (2d ed.), p. 67, McGraw-Hill Book Company, Inc., New York, 1942.

⁴ *Ibid*, p. 67.

⁵ Bennett, C., *Scientific Salesmanship*, p. 50, American Efficiency Bureau, St. Louis, Mo., 1933 quoting E. St. Elmo Lewis, formerly advertising manager for the Burroughs Adding Machine Co.

⁶ Y.M.C.A. Standard Course on Salesmanship, as quoted by Russell, *Textbook of Salesmanship*, pp. 1-6, McGraw-Hill Book Company, Inc., New York, 1924.

⁷ Bennett, *op. cit.*, p. 2.

Frederick lists the duties of the salesman.¹ A summary of this chart of operations follows.

A. Making the sale

1. Gets acquainted with the prospect and gathers information concerning him
2. Plans the interview
3. Analyzes the prospect's needs by observing, examining records, talking with employees
4. Demonstrates
5. Presents facts; answers objections—tells how product is made, why it is superior, etc.
6. Appeals to buying motives, such as saving time or money
7. Fights competition—studies the products and methods of competing firms
8. Writes sales letters and written propositions
9. "Creates good will toward himself by talking on topics not related to the sales of machines"
10. Solicits signed orders—sometimes eight or ten calls must be made before the order is signed, although the average number of calls is four or five
11. Makes collections and determines credit ratings of prospects
12. Helps other salesmen—by teaming with them for interviews, helping them analyze sales and determining best methods of selling

B. Routine duties

1. "Follows instructions in the following respects"
 - a. Attends salesmen's meetings
 - b. Memorizes the standard demonstration
 - c. Passes training course
 - d. Makes collections
 - e. Reports sales of competitors in his territory
 - f. Assembles a sales portfolio
 - g. Makes a daily report on calls
 - h. "Must work regularly day by day"
 - i. Must report to the office in the morning
2. Makes reports on calls and sales
3. Keeps records on deals pending, demonstrations and calls, sales, appointments

¹ Frederick, J. G., *Modern Salesmanship*, pp. 64-76, Henry Holt and Company, Inc., New York, 1925

4. Cares for equipment and stock
 5. Keeps informed concerning changes in price, changes in the product, new uses of the product
- C. Service
1. Installs his products
 2. Trains operators to use the product or machine
- D. Executive
1. Plans for the day's work, *i.e.*, deals, appointments, collections
 2. Plans ahead
 3. Gathers facts concerning sales possibilities in the sales territory
 4. Supervises the work of assistants
 5. Gathers local sales arguments
 6. Works out new selling methods and suggests type of product his customers want
- E. Creates good will toward himself and his company
1. Good-will services that are not directly related to sales, such as suggesting improvements in the prospect's system, making good-will calls, etc.
 2. Adjusts complaints
 3. Participates in social affairs
 4. Boosts the company—its services and policies

TABLE 175.—TIME STUDY OF THE ACTIVITIES OF DRUG SALESMEN

Activity	Per cent of Salesmen's Total Working Time
Order taking	16.149
Selling.	22.952
Traveling.	29.257
Visiting.	15.923
Waiting.	10.239
Lost by interruption	3.070
Other.	2.410
Total.	100.000

Selling, properly done, requires study, preparation, care, and hard work.

A time study of wholesale drug salesmen's activities was made by Carroll.¹ Each salesman was accompanied by a man with a stop watch, who timed the activities. The results are shown in Table 175. Note that these salesmen spend a little less than 23 per cent of their total working time in actual selling.

¹ Carroll, G. V. S., field sales *Organization of the Dennison Manufacturing Company*, American Management Association, Sales Executive Series, 1925. **15**, p. 8.

Kenagy and Yoakum made time analyses of the activities of salesmen of four different companies: Company *A*, located in the midwest, manufactured speciality products for household use; Company *B* manufactured high-grade food products; Company *C* made an office specialty; Company *D* manufactured office supplies. This study included an analysis of the manner in which the salesmen spent their time in the office or store and in the field (see Tables 176 and 177).¹

TABLE 176.—DIVISION OF SALESMEN'S TOTAL TIME IN THE FIELD

Activity	Per cent of the time			
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
Reaching prospective buyer.....	28.0	15.7	49.4	41.5
Sales interview.....	36.4	28.4	34.5	19.5
Good will*.....	6.5	39.00	5.8	6.5
Routine duties*.....	9.9	.....	....	15.5

* Good will refers to conversation other than sales conversation, service, adjustment, etc. Routine duties include correspondence, filling out records, caring for equipment, etc.

TABLE 177.—DIVISION OF SALESMEN'S TIME WITHIN OFFICE OR STORE

Activity	Per cent of the time			
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
Sales interview.....	50.6	33.4	68.1	45.5
Good will.....	3.8	46.6	11.5	15.1
Routine duties.....	13.8			
Collections.....	9.0	4.2		
Waiting.....	22.8	15.8	20.4	39.5

Time studies of the salesman's activities are used to develop standards for the job of selling and to make the best use of the time and effort of the salesman.

QUALITIES OF THE SALESMAN

"Personal qualifications must be considered in relation to the sale of a specific product or service and a definite sales job. The qualifications of a competent insurance salesman are unlikely to be the same as those of a good automobile salesman, as the duties and responsibilities of the two men are not comparable."²

¹ Kenagy, H. C., and Yoakum, C. S., *The Selection and Training of Salesmen*, Chap. 7, McGraw-Hill Book Company, Inc., New York, 1925.

² Canfield, B. R., *Salesmanship: Practices and Problems*, p. 39, McGraw-Hill Book Company, Inc., New York, 1940.

Rating Scales.—An example of the way in which qualifications for selling may be evaluated is found in a study of 10,000 salesmen employed by 11 life insurance companies from 1933 to 1935, made by the Life Insurance Sales Research Bureau.¹ Factors from the personal history of successful and unsuccessful salesmen were compared, and the following weights were established:

1. Dependents:	
no dependents.....	3
one dependent.....	4
two dependents.....	6
three dependents.....	8
four dependents.....	8
five dependents.....	7
six or more.....	4
2. Occupation:	
executive, not in retail business.....	10
office worker, semi-executive.....	8
salesman of real estate.....	6
professional.....	6
salesman of tangibles.....	4
manual work.....	1
3. Employment status:	
employed.....	6
unemployed less than one month.....	8
unemployed one month.....	7
unemployed four months.....	4
unemployed six months or more.....	2
4. Time with present employer:	
less than three months.....	3
3 to 8 months.....	4
2 years to 3-11 years.....	6
8 years or more.....	9
5. Present membership in organizations:	
none.....	3
one.....	3
two.....	4
three.....	8
four or more.....	11
6. Net worth:	
\$0 to \$999.....	2
\$1,000 to \$5,999.....	4
\$6,000 to \$9,999.....	6
\$10,000 to \$14,000.....	8
\$15,000 or more.....	10

¹ Canfield, *ibid.*, pp. 44-46.

An applicant is then evaluated on the basis of these weights. For example, if John Doe were a salesman of real estate, unemployed one month, belonged to two organizations, had one dependent, had been with his last employer 2 years 5 months, and had a net worth of \$4,500, he would have a weighted score of 31. This score is then interpreted, in terms of age, as "excellent," "very good," etc.

The validity of such a system was indicated by the Guardian Life Insurance Company.¹ Using the table of factor weights (shown

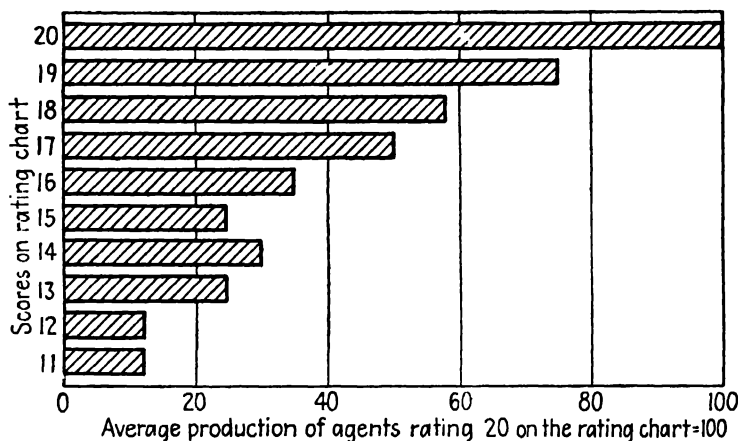


FIG. 69.—Relation between score on rating chart and average first-year sales.

above) as a basis, they developed a personal rating scale, using seven factors—age, education, marital status, previous experience, financial status, years in the community, and employment. The relationship between average first-year sales and scores on the rating scale is shown in Fig. 69.

The values of this method of predicting sales success are pointed out by Viteles: “. . . The relatively simple device of determining experimentally the significance of marital status, number of dependents, organization affiliation, and so on, to sales accomplishment has withstood the test of time better than any other single method employed in predicting sales achievement.”² However, he warns that the specific items and weights, to be valid, must be experimentally discovered by each specific company using the method.

The steps in the analysis of application-blank items, as listed by

¹ Chart System for Choosing Salesmen, *Printer's Ink Monthly*, March, 1939, p. 49.

² Viteles, M. S., *The Value of Psychology in Selecting Salesmen*, American Management Association, Marketing Series, 1941, No. 45.

Rosenstein, Director of Personnel Research Foundation, are¹

1. Classification of application blanks

Using four groups—very good, good, fair, and poor—classify each application blank in the group to which the salesman belongs, using the man's status as a salesman as a criterion.

2. Tabulate the data and derive the success percentage.

Establish a table for each item within each of the four groups.

3. Assign values to each item.

4. Develop scores—from the point values derived in step three, establish the range of scores for each of the four groups.

5. Use the scores in selection.²

Tests.—Tests are becoming increasingly popular as a means of differentiating good salesmen from poor ones. A psychological test is merely a sampling of a man's ability or behavior. Types of tests most frequently used to rate salesmen are mental ability, sales interest and aptitude, personality, verbal ability, and, in some cases, clerical and mechanical ability. By giving a test to present employees and comparing the scores with the individuals' performance records, critical scores can be established.

Mental abilities tests measure general academic intelligence and mental alertness. The most successful salesmen are seldom the most intelligent. Successful salesmen of liquor, tobacco, feed and produce, and health and accident insurance score between the 30th and 70th percentiles on an intelligence test.³ However, for salesmen who deal with higher executives or who are sales engineers, the 60th percentile is the lower critical score.

A study of the intelligence test scores of 1,500 salesmen representing 12 companies indicates that⁴

1. The complexity of the sales job is indicated by the group test score of the salesmen holding the job, or vice versa.

2. There is little direct relationship between the intelligence test score and the production of a salesman, except in the highest group of sales positions.

3. In the more complex sales jobs, there is a direct positive relationship between intelligence and length of service; in less complex sales jobs, there is an inverse negative relation between intelligence and length of service.

4. Salesmen differ markedly from other occupational groups in intelligence.

¹ Rosenstein, J. L., *The Scientific Selection of Salesmen*, p. 77, McGraw-Hill Book Company, Inc., New York, 1944.

² For a detailed explanation, See Rosenstein, *ibid.*

³ Rosenstein, *ibid.*, p. 160.

⁴ Kenagy and Yoakum, *op. cit.*, pp. 257-258.

Table 178 shows the relative intelligence levels of various business occupations in terms of raw scores.

TABLE 178.—INTELLIGENCE LEVELS OF VARIOUS OCCUPATIONS

Occupation	Number in group	Range of middle 50 per cent of scores	Median
Major business executive.....	84	90-156	127
Sales engineers.....	94	110-150	120
College seniors.....	100	100-137	118
School superintendents and special subject teachers.....	97	100-119	109
Business executives (general group).....	78	82-116	102
Real estate sales.....	25	80-115	102
Office speciality sales.....	111	60-112	95
Insurance sales.....	326	60-110	86
Office clerks.....	267	55-105	84
Routine sales.....	191	41-94	71
House-to-house sales.....	160	30-95	65
Policemen (all grades).....	147		42
Retail sales clerks.....	52	20-50	33

Many lists of traits have been compiled, and much has been written about the personality of the salesman. A hearty handshake and "hail-fellow-well-met" attitude are no longer considered to be the only necessary personality characteristics of the salesman. Dodge,¹ using the Bernreuter Personality Inventory, found that successful salespeople

1. Are less moody and worry less
2. Are more self-confident and self-sufficient
3. Are more aggressive and willing to assume responsibility
4. Are more social
5. Are less self-conscious
6. Are less desirous of telling others of personal fortune
7. Are less resentful of criticism or discipline
8. Tend to report themselves as more radical or unconventional

To this list Ream² adds flexibility, independence, faith in the established order, geniality, and cordiality. Dominance is another trait found to be characteristic of salesmen.³

¹ Dodge, A. F., *What are the Personality Traits of the Successful Salesperson?* *J. Appl. Psychol.*, 1938, **22**, 229-238.

² Ream, M. J., *Ability to Sell*, The Williams & Wilkins Company, Baltimore, 1924.

³ Rosenstein, *op. cit.*, p. 163.

The personal qualities of the salesman considered most important by professional buyers—the purchasing agents of seven large corporations—are shown in Table 179.¹ One hundred and forty-one salesmen were rated, 74 of whom were successful, and 67 unsuccessful. Professional buyers prefer professional salesmen—those who are sincere, courteous, enthusiastic, self-confident, self-controlled, and alert.

TABLE 179.—PERSONAL QUALITIES OF SALESMEN, AS RATED BY PURCHASING AGENTS

Quality	Rank	Rating (possible 100)
Sincerity	1	82
Courtesy	2	82
Enthusiasm	3	80
Self-confidence	4	79
Self-control	5	77
Alertness	6	77
Appearance	7	76
Tact	8	75
Use of English	9	74
Aggressiveness	10	73
Voice quality	11	69

TABLE 180.—RELATIONSHIP BETWEEN SALESMEN'S SCORES ON INTEREST INVENTORY AND RATING BY MANAGER

Score on interest inventory	Rating by managers (per cent)		
	Outstanding success	Success	Failure
+6	25	53	22
+4 and +5	16	56	28
+3 to -2	11	47	42
-3 to -5	8	39	53
-6	4	20	76

Because interest is an important factor in success, interest tests are being used more and more widely. The Strong Vocational Interest Test, made up of items concerning occupations, school subjects, activities, types of people, and personal characteristics, is most widely used. The testee indicates the items he likes, is indifferent to, and dislikes. The results are then compared with the interest profiles of successful men in many different occupations. The test is based on the

¹ Canfield, *op. cit.*, pp. 54-55.

assumption that, if a man has interests corresponding to the interests of successful men in a given occupation, he is likely to succeed in that field.

That the interest inventory can be used successfully in the selection of salesmen is indicated by a survey made by the Aetna Casualty and Surety Company. While attending a school conducted by the company, 588 men filled out the inventory. A year later they were rated

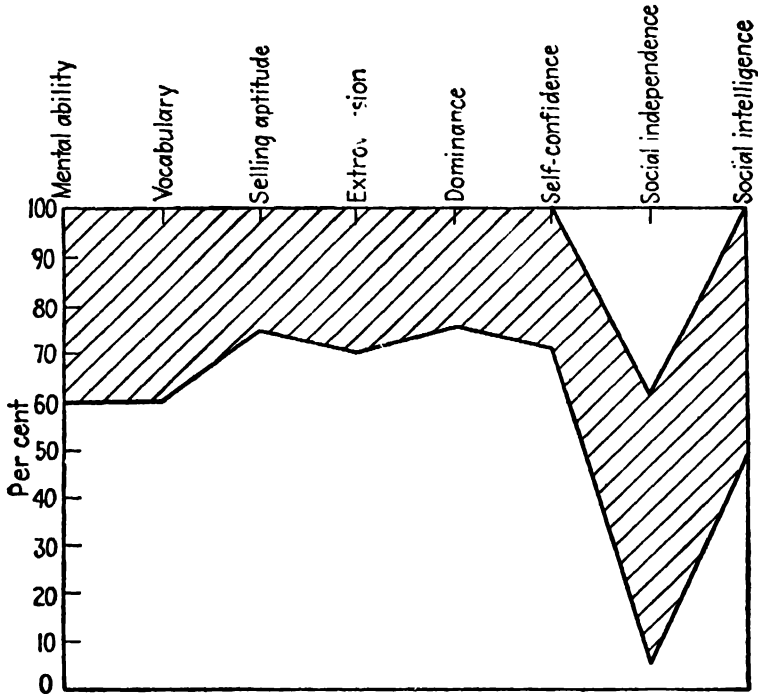


FIG. 70.—General profile of high-level salesmen. (From Rosenstein, J. L., *op. cit.* p. 242.)

by their managers on their degree of success. Scores on the test ranged from +6 to -6. The relationship of the interest inventory to the manager's ratings is shown in Table 180.¹ Although the interest inventory is frequently unreliable in individual cases, it is significant for groups. For example, Strong² reports that life-insurance salesmen with B+ on the life-insurance interest ratings earn twice as much as those with C ratings; men with A ratings earn almost three times as much as those with C scores. (He found the average annual paid-for

¹ Bills, M. A., Relation of Scores on Strong's Interest Analysis Blanks to Success in Selling Casualty Insurance, *J. Appl. Psychol.*, 1938, 22, 97-104.

² Strong, E. K., *Vocational Interests of Men and Women*, p. 491, Stanford University Press, Stanford University, Calif., 1943.

production of men with a *C* rating to be \$62,000; for men with a *B*+ rating, \$127,000; *A* rating, \$169,000.)

A summary of the scores of high-type salesmen and lower-type salesmen on the various tests is shown in Figs. 70 and 71. Figure 70 is the "general profile within which high-type salesmen fall. It was drawn as a composite of the records of salesmen in pharmaceutical manufac-

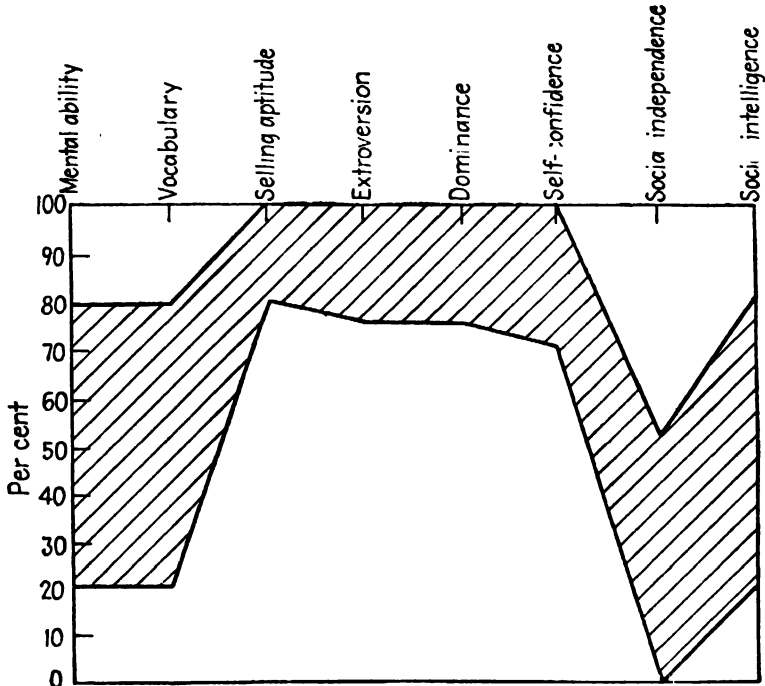


FIG. 71.—General profile of lower-level salesmen. (From Rosenstein, J. L., *op. cit.*, p. 243.)

turing, dairy machinery, office-form machinery, truck and trailer manufacturing, casualty insurance, economic service, stock, bank extension, steel products, and display advertising sales." Figure 71 shows the range "within which lower-level salesmen fall and is a composite of the profiles of salesmen in distillery sales to taverns, tobacco to retailers, feed and produce, furnace and household appliances, roofing and siding, and used automobile sales."¹

It must be remembered that there are extreme variations among sales jobs and, therefore, among the traits and characteristics of the man who is successful on the job. A large electrical corporation may require that its salesmen be graduate engineers, yet wholesalers of feed

¹ Rosenstein, *op. cit.*, pp. 242-243.

and produce may find that salesmen above the 80th percentile in mental ability are unsuccessful in that selling situation. The traits of the successful salesman vary with the product being sold and with the buying public.

SUMMARY

The psychology of business is rapidly expanding to include a factual approach and the use of scientific procedures. The size, color, layout, illustration, headline, etc., of the advertisement have been analyzed to determine the most effective methods of advertising. Research has shown that the most successful advertisements appeal to basic wants, such as hunger, sex, social approval. Color improves the attention value of an advertisement approximately 60 per cent. A full-page advertisement will draw more attention than a smaller one, but the attention value is not in proportion to the size. Cuts and illustrations not only catch the reader's eye, but also supplement and explain the text. The headline usually contains the main point of the advertisement and stimulates the reader to examine the advertisement further. The most important advertising media are newspaper, which is universally read, but has a short life; magazine, which has a national scope, but is more costly than newspaper advertising and must be planned far in advance of actual publication; radio, which is one of the most direct, personal, and expensive of media. Advertising is tested by several methods—preliminary sale test, coupon or inquiry test, consumer attitude, etc.—to determine the effectiveness of the advertisement.

Consumer research is the producer's method of keeping in contact with the wants and needs of the customer. As businesses grow larger, consumer research becomes increasingly necessary.

Salesmanship is an occupation only recently invaded by scientific research. It is largely theory, with few facts. Analysis of the salesman's activities show that in addition to actual selling (which consumes only about 23 per cent of the salesman's total working time), he has many other duties, such as servicing customers, increasing good will, preparing reports, keeping up-to-date in his field, etc. The average successful salesman is sincere, self-confident, socially adaptable, with a high degree of selling aptitude and interest.

RECOMMENDED SUPPLEMENTARY READING

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CHAPTER XVII

PSYCHOLOGY IN MILITARY AFFAIRS¹

- Psychological Nature of Warfare
- Utilization of Manpower for Warfare
 - Psychological Examining of Selectees
 - Classification and Assignment
 - The Reception Center
 - The Replacement Training Center
 - Major Problems in Classification and Assignment
 - Specialist Training
- Conduct of Psychological Warfare
 - War of Nerves
 - Morale Building
 - Adjustment to Military Life
- The Role of the Psychologist in the Military Services
- Psychological Aftermath of War
 - Adjustment Problems of the Returned Serviceman
- Psychological Preparation for Peace

PSYCHOLOGICAL NATURE OF WARFARE²

The applications of psychology in military affairs are old in origin and wide in scope. Modern warfare has extended and refined them, experimented with them, and utilized them with scientific precision. Our generation cannot claim credit for the introduction of psychology into warfare, but it can claim credit for increasing scientific applications of psychological principles. Not all applications can be encompassed in this chapter; many have counterparts, often identical, in civilian life, which have been treated in other sections of this book.

The military psychologist is not obligated to theorize about causes of war. He is one element of society's cutting edge concerned with the most effective prosecution of the war and must operate on the assumption that war is, or will be, a *fait accompli*. He does need to understand the human fighting machine, to know that men will suffer and die while preferring to live in comfort, that they will accept regimentation as a

¹ This chapter was written by Dr. George L. Fahey, Assistant Professor of Education, University of Pittsburgh, and Dr. Murray M. Mintz, formerly U.S. Army Classification and Counseling officer.

² References cited in this chapter are from nonmilitary or unclassified military publications. Opinions stated are those of the authors and are not to be construed as reflecting War Department or Navy Department policies.

means of fighting for individuality, that they will make supreme sacrifices for one group of men while trying desperately to annihilate another group of apparently similar men. Such paradoxical behavior is not different, except in its frequency, from the behavior problems any psychologist encounters among men facing conflicts.

War is a violent expression of a conflict, a method of problem solving aimed at destruction of the adversary. It is as old as human history and by no means limited to human beings. It is derived from basic urges for self-expression, self-preservation, and, undoubtedly in some degree, from the psychoanalytically described urge for self-destruction. It differs only in complexity from Cain clubbing Abel to death, because Cain experienced a conflict (which he blamed on Abel) and which he sought to relieve by the extinction of Abel. "Only in complexity," however, is not a phrase to be passed over lightly. Wars are made and fought and won by numerous Cains and Abels who show certain peculiarities in their collective behavior that they often do not reflect individually.

Traditionally, war has been made a sort of tribal fetish, surrounded with glamour and ideological infusion of divine guidance, and in some cultures has become a goal rather than a means to an end. The two World Wars (some historians are saying there has been only one, long continued) have stripped many of the gaudy trappings from war and shown it to be a dirty business, infamously conceived and foully conducted. However, enough of the glamour remains to make it continue to appear as a convenient panacea for national or international distress.

Resort to war among primitive peoples is commonly aggression for economic gain, or resistance to such real or imagined aggression. As cultures are enriched, the causes of war are multiplied, and wars arise from motives other than physical occupation of territory or custody of cattle. Struggle for self-expression, to impose a creed or culture, to gain *Lebensraum*, to inflate national ego by enslaving a neighbor, to divert internal contentions and other conflicts, always unites with economic frictions to produce wars between civilized nations. Often the basic causes are so obscured by verbalized ideologies that only the historians can unravel them. In recent years, war involves the total strength of a nation. All the resources of one nation are thrown against all the resources of another.

The military psychologist needs to bear in mind that, while nations fight, nations themselves are incapable of fighting. Marble halls do not throw stones; documents do not tear one another to shreds; the Statue of Liberty is not a flame-thrower. Individual human beings make the wars and fight them. The social psychologist must discover

why; the military psychologist, however, accepts war as a fact and capitalizes on the strengths of his own forces and the weaknesses of his enemies. How to fight most effectively is the problem of the military strategist and the military psychologist alike.

UTILIZATION OF MANPOWER FOR WARFARE

Traditionally the United States has depended upon a small professional army to be supplemented by the militia in emergency. A small minority of the militia maintained some military organization in National Guard, Officers Reserve Corps, and the like. The regulars were a token force used for incidents, or as training cadre in case the militia was called. In the early days of our national history, most men lived a life that allowed them to become soldiers in a relatively short time. However, in recent years, the pattern of civilian living has tended markedly away from rigorous living, and, concurrently, military operations have become so complex that the fighting man must be a specialist as well as able to live under adverse conditions. Consequently, it is now necessary to select men carefully for military service and place them at the task they best fit.

PSYCHOLOGICAL EXAMINING OF SELECTEES

Psychological screening was a specific mission of the Armed Forces Induction Stations where the process of eliminating the mentally, emotionally, and morally unfit received increased emphasis during the war period. The psychological (as distinct from psychiatric) examination at these stations was a screening, not a grading operation. The objective was the segregation of those who could not read and write and the elimination of those of that group who would not be able to learn these skills in a reasonable length of time. Evidence that a man had graduated from an English-speaking high school or had been successfully employed in an occupation requiring functional literacy was adequate to establish his literacy. Lesser training or experience necessitated the use of a short minimum literacy test consisting of a paragraph to read and some questions based on it to answer. Failure to pass this test was considered evidence of illiteracy. For military purposes, literacy was defined as ability to read and write as well as the average fourth-grade child, since that seemed to be the minimum level necessary for the soldier to cope with the written General Classification Test, to read bulletins and orders that might pertain to him personally, and to keep up correspondence with his family.

Nonlanguage tests were employed to determine if an illiterate had sufficient mental ability to justify sending him to a special training unit

to learn to read and write. Best known of these nonlanguage tests, successor to the Army Beta Test of the First World War, was the Visual Classification Test (VC and VC1A). In this test the subject is confronted with a series of pictorial items in groups of five. Of each five-item group, four are somehow alike but the fifth is different. The examinee crosses out the one that is not like the other four. Several sample items are given for demonstration by the examiner. The test proceeds with a minimum of verbalization but with much emphasis on ability to comprehend and follow directions, an important function for the soldier.

Illiterates who showed sufficient intelligence to justify literacy training were inducted, and others were rejected. Suspected malingerers were detected, if possible, and referred to the military psychiatrists. It is probable that very few men malingered their way out of the service on the grounds of illiteracy or mental defectiveness. The simulation of such defects is usually recognized with ease by the trained examiner.

Experiences early in the Second World War thoroughly exposed the fallacies of two popular notions—first, “Anyone who isn’t smart enough to get along in the world is good enough for the Army,” and second, “The Army will either make a man or break him.” Specialized warfare has no place for the mentally defective or for the generally maladjusted individual. A circular letter from the Surgeon General’s Office¹ clearly stated War Department policy on this matter.

The army is one of the elements of national defense and its present mission is one of preparation for an offensive-defensive type of warfare. It is in no sense a social service or a curative agency. It is to be considered neither a haven of rest for the wanderer or shiftless, nor a corrective school for the misfits, the ne’er-do-wells, the feeble-minded or the chronic offender. Furthermore, it is neither a gymnasium for the training and development of the undernourished or underdeveloped, nor is it a psychiatric clinic for the proper adjustment to adult emotional development. Therefore, there is no place within the army for the physical or mental weakling, the potential or prepsychotic, or the behavior problem. If an individual is a behavior problem in the civilian community, he will certainly become a more intensified problem in the army.

Although accomplished by psychiatrists rather than psychologists, another major type of psychological screening took place at the induc-

¹ Circular Letter, No. 19, Surgeon General’s Office, War Department, March 12, 1941, as quoted by James W. Layman, 1st Lt. S.C., AUS, Utilization of Psychologists in the General Hospitals of the Army, *Psychol. Bull.*, 1943, 40, 212–216.

tion stations. This was the elimination of the emotionally unstable, immature, psychotic, prepsychotic, or perverted selectee.

According to Ebaugh,¹ the military misfit is one who lacks capacity to meet or stand the stress of prolonged military experience because of structural or functional defects. Men who temporarily show the strain of severe fighting can be easily helped; those who are easily upset are not wanted in a crisis. They are a dangerous source of weakness. Not only are they suffering, but they readily and unknowingly disturb others and by suggestion destroy the morale of their associates.

Eight categories of such men were listed by the Surgeon General's Office:

- I. Persons below minimum literacy (shown by a score of 9 in the Army information Sheet)
Persons below minimum mentality (shown by a score of 35 in the Visual Classification Test)
(Standards of literacy and mentality as determined by psychological tests and usually corresponding to fourth-grade educational level)
- II. Psychopaths having shown persistent misbehavior or a poor work record
- III. Inductee previously hospitalized for a mood disorder, or one who shows evidence of markedly impaired judgment during mood swings
- IV. Psychoneurotics showing any of the following patterns:
 - a. Inefficiency in work or school
 - b. Long periods of inactivity or hospitalization
 - c. Excessive drifting from place to place, job to job, or doctor to doctor
- V. Pre-psychotics, post-psychotics or schizophrenics presenting:
 - a. A previous history of psychiatric hospitalization
 - b. A definite picture of oddness or peculiarity after a three to six minute examination
- VI. Alcoholics showing any of the following:
 - a. Excessive drinking resulting in the loss of jobs
 - b. Repeated arrests
 - c. Reliable history of hospitalization for excessive drinking
 - d. Narcotic and sedative addicts
- VII. Persons with any type of syphilis of the nervous system
- VIII. Inductees showing an existent organic disease of the brain, spinal cord, or peripheral nerves
Inductees showing residual effects from nervous system disease that would prevent moderately efficient day to day work and a regular routine of living

¹ Ebaugh, F. G., Misfits in Military Service, *Diseases of the Nervous System*, 1943, 4, 3-8.

Cases giving a reliable history of convulsion, fainting, treatment for epilepsy, "black-outs," fits, spasms, or "falling out spells," regardless of etiology

CLASSIFICATION AND ASSIGNMENT

Some basis of classification and assignment of military personnel has likely existed ever since men first pooled their martial efforts. However, modern classification has gone far from the system of the apocryphal Boer War Colonel who touched each man with his riding quirt as he came down the gangplank, announcing, "You're a cook," "You're a rifleman," "You're an orderly," etc. Modern militarists find a less arbitrary system imperative. They depend instead upon objective testing criteria, conversion tables for transposing civilian jobs into military ones, tables of attrition, tables of organization, and many other impedimenta of classification.

The Staff in the Personnel Research Section of the Adjutant General's Office has reviewed the history of Army classification procedure.¹

No provision was made for the placement of recruits in the First World War until after mobilization had begun in 1917, but the place of scientific tools in the personnel system of the Army was well established by Armistice time.

Testing and classification were the functions of two agencies in 1917 and 1918, because of the fact that mental testing was at first considered merely as a reliable method of eliminating mental incompetents who would be altogether unable to learn the performance of even the simplest military tasks. The services of the men who devised the Army Alpha and Beta tests were therefore offered to the Surgeon General; and the Division of Psychology of the Medical Department continued in charge of this work until the end of the war, although the Division's functions, as they developed, departed radically from the narrow field originally envisioned.

Some of the tests and methods devised during the First World War, although changed, are still in use; for example, the general classification test, the grade system for indicating degrees of relative ability to learn, and trade tests.

During 1917 and 1918 and in the years following, very little attention was paid to the question of efficient classification and placement. After 1918 Army Regulations called for a shortened form of the Stanford-Binet to be administered to recruits. With the exception of

¹ Staff, Personnel Research Section, Classification and Enlisted Replacement Branch, The Adjutant General's Office, Personnel Research in the Army: I. Background and Organization, *Psychol. Bull.*, 1943, 40, 129-135.

the Army Air Corps and the Signal Corps, little use was made of the test in classification and selection. This disinterest was to be expected with the rapid demobilization and the maintenance of a small peacetime Army in the following years.

Concurrently, the utilization of classification and assignment procedures in business, industry, and government service expanded greatly. Transfer of these procedures enabled psychologists and personnel technicians to adapt quickly to their enormous task in the Second World War. Many new devices had been developed in selection and testing, and a large group of men with both training and experience in the field of personnel work were available almost immediately to the Armed Forces.

A special agency to deal with army test construction was organized in the spring of 1940 and an advisory committee was set up on the Classification of Personnel in the Army with Dr. Walter V. Bingham as chairman.

During the summer of 1940 an Army Regulation (Enlisted Men Initial Classification) was drawn up establishing the Army Classification policy and making provision for a complete testing program. The first trial forms of what became known as the Army General Classification Test, the AGCT, were constructed. For illiterates or those men whose language was other than English, nonlanguage tests were prepared; also, the first forms of the clerical and mechanical aptitude tests were devised. By the time of the passage of the Selective Training and Service Act in September 1940, the tests were in process of standardization and validation. Early the next year all those men who had come from the Regular Army and National Guard were classified on the basis of the new tests and procedures.

With the advent of the Selective Service Act, new problems presented themselves to those concerned in Army Personnel Classification. According to the Personnel Research Section,¹ the factors responsible were as follows:

"(a) sudden influx of large numbers of men, (b) increase in the range of mental ability and type of background of soldiers, (c) need for the selection of more officer candidates, and (d) need for rapidly and accurately determining degrees of skill and aptitude as a basis for special selection or training." Additional professional personnel were obtained and reorganizations effected to meet the growing demands of the arms and services for tests used in selection problems.

With special selection programs of the various arms and services, an increasing number of tests measuring specific achievement, aptitude, or

¹ *Ibid.*

knowledge were developed. Selection for Officer Candidate Schools called for the construction of a Higher Examination that would better differentiate between the abilities of men in the Army grades of I and

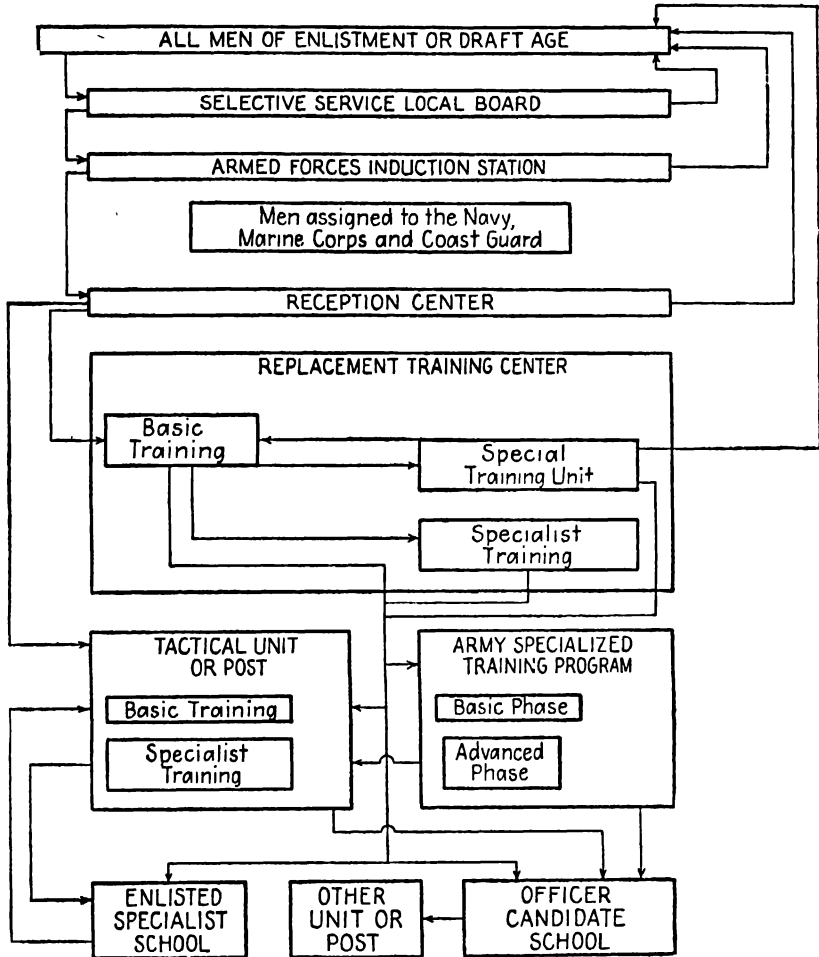


FIG. 72.—Flow Chart—Army Classification System.

II. Tests for Warrant Officer Candidates were drawn up in 1941 for approximately 30 specialities.

"This chart [Fig. 72] is intended to illustrate only the major agencies and organizations through which a man may pass or to which he may be assigned in the process of Army classification. Military necessity, local conditions, or special requirements of some arms

or services make it impossible to show more than the usual stages involved."¹

THE RECEPTION CENTER

Reception Centers located at strategic points received all men inducted into the Army, introduced them to the service, began their classification, made their first assignment and provided a brief introductory training. The average soldier will recall the reception station as a place where he received a heavy measure of "housekeeping details," such as kitchen police and area police (picking up cigarette butts and candy wrappers), and sore feet from new G.I. shoes; but the initiation of his classification was the most important thing that happened.

His classification began with the AGCT (Army General Classification Test), which yields a score indicative of his relative ability to learn as compared with other soldiers. Raw scores were transmuted to standard scores for record purposes and also into grades. These grades were as follows: I, for very rapid learners; II, for rapid learners; III, for average learners; IV, for slow learners; and V, for very slow learners. Standard score and grade were entered on a man's Qualification Card (Form 20), which accompanied him throughout his term of service. Retests were possible for cases considered to be unreliably measured, and in 1944 the Army Individual Test was introduced and administered as an individual examination standardized against the AGCT. Similarly, the inductee also took the Mechanical Aptitude Test and usually the Radio-telegraph Operator Aptitude Test. These tests were designed to assist in the selection of man for critically needed specialist training in mechanical jobs or in the highly important skill of radio operation.

Most important of the classification steps at the Reception Center was the interview. Trained specialists interviewed each inductee at length using as a guide and record sheet the Soldier's Qualification Record (see Figs. 73*a* and 73*b*). Interviews were informal and conversational in nature but aimed directly at the determination of a suitable assignment. Test scores were commonly available for the interviewer to use in conjunction with previous military experience, hobbies and special interests, knowledge of languages, and record of physical condition.

All this information was utilized by the assignment officer in

¹Staff, Personnel Research Section, Classification and Replacement Branch, The Adjutant General's Office, *Testing as a Part of Military Classification*, *Science*, 1943, 97, 3.

FIG. 73a.—Soldier's qualification record.

IMPORTANT - UNDER NO CIRCUMSTANCES WILL THIS CARD BE FOLDED ROLLED OR CREASED

FIG. 736.—Soldier's qualification record.

recommending an assignment. Theoretically, assignments were made to replacement training centers, but they were also made to specific jobs or to field units. Inductees with highly developed skills useful to the service were often assigned directly from the Reception Center to jobs. Other men, especially early in the war, were often assigned to field units for training rather than the replacement training centers. All men were assigned to a basic arm: Infantry, Cavalry, Armored, Field Artillery, or Coast Artillery, or to one of the services: Quartermaster Corps, Engineers, Medical Department, and the like.

Assignment was based on three factors—what had a man done? what was he capable of doing? and where was he needed most? The first two questions were answered by the tests, the interview, and his physical condition; the third, by requirement rates. Each reception center was allotted quotas by the War Department upon a daily or weekly basis. Every week so many men per 1000 had to be sent to the Infantry, to the Air Forces, or to other arms or services. In addition, “rare birds” were held out and specially assigned. Irregular requisitions often came for excesses of certain types, as 50 additional cooks for Fort Knox or the next 20 radio repairmen to Fort Monmouth. The needs of the service proved to be fluctuating and often exasperating to the classification officer. To the insistent demands of quotas most stories of misassignment may be traced; thus, John Jones was trade-school trained as a refrigeration mechanic, but the Army made him a truck driver; while Bill Smith, who drove trucks for 10 years, was trained to be a medical technician. Undoubtedly, there were errors in assignment in the haste and waste of mobilization, but most such cases arose from the fact that when Bill Smith came up for assignment there was a priority on medical aid men while the refrigerator mechanic hit a period of demand for drivers. Largest of all these demands, of course, was for the combat rifleman; and lawyers, farmers, pharmacists, and all others with sound bodies stood subject to that assignment unless they happened to fall into the “rare birds” categories; *i.e.*, those inductees who brought into the Army rare and valuable civilian occupational training or experience. Radar technician is a good example while another is psychologist, which, in fact, was in many cases rare enough to yield a commission.

An exception to the above process was the illiterate who was forwarded to a Special Training Unit for training and then returned to the Reception Center for processing.

The Soldier's Qualification Record, WD AGO Form No. 20 (Fig. 73) was developed with a view of furnishing a record form that combined the features of continuity, accessibility, and comparability. It

was initiated at the Reception Station and followed the man throughout his Army career. Each unit commander under whom he served was responsible for maintenance and entry of accumulative data on the man's card. The form was always readily accessible to the unit commander and others concerned with the soldier's training and duties. In some units it was kept in the company, where it had utmost accessibility to those most directly concerned. In other units it was kept in the battalion or other higher echelon, where it was available to the company officers and also could be used for classification and assignment within the larger unit. The card is highly standardized, had few and only slight revisions throughout the war, and allows comparison of the man with any other man whose record is available regardless of location in the Army. Similar forms, WD AGO Form No. 66-1, 66-2 and 66-3, were used for officers.

For purposes of classification and assignment in divisions, corps, service commands, or other high echelons, machine record forms were kept for rapid sorting of many cards on the basis of all pertinent and recorded data. Such records involved the use of complex machines and skilled operators and were less useful at lower levels, where cards were sorted by hand.

REPLACEMENT TRAINING CENTER

From his assignment to a service branch at the Reception Center, the recruit usually moved within a week to a Replacement Training Center, where he was trained as a replacement to fill a vacant position in a field unit. The course combined training in skills necessary to all soldiers, such as physical conditioning, use of rifle, map reading, etc., and individual training for a particular Army job. In most cases he left the RTC after 13 to 17 weeks with a military occupational specialty (MOS) and was assigned to a field unit for further training or for duty in that specialty.

During the entire process, he was subject to reclassification and reassignment as his special strengths and weaknesses were evidenced in tryout experiences. Even in combat, classification was a continuous process and men shifted jobs with the loss of other men. Most illustrative were the battlefield commissions for enlisted men who demonstrated exceptional leadership qualities.

Except in combat, the ever-present tool of continuous classification was the Soldier's Qualification Record with its information concerning test scores and background experience. New data were cumulatively added indicating service schools attended, duties performed with appropriate dates and rating on manner of performance in terms of

"skilled," "semiskilled," or, for trainees, "potential." On the basis of recorded scores and background, a man was considered for Officer Candidate School, for college training in the Army Specialized Training Program, or for specialist schools in radio, auto, or tank mechanics, meteorology, and many other needed military specialties. Conversely, men found inadequate could be sent to STU's or, in some large camps, to special developmental battalions where grossly inept ones were discharged to civilian life.

The Military Occupational Specialty (MOS) with its attendant code number (SSN, for Specification Serial Number) identified the duty a man was expected to perform. All Army jobs (enlisted) were described in War Department Technical Manual 12-427.¹ The following are illustrative and of particular interest to the student of psychology.

CLASSIFICATION SPECIALIST (275)

Interviews enlisted men to obtain civilian and military job history and other related information to be used for classification and assignment of military personnel.

Obtains and records soldier's personal history, education, aptitudes, interests, hobbies, civilian work history, and military experience. Periodically checks the military occupational specialty and duty status against the qualification card of each man in the organization and ascertains whether military personnel are classified and performing duties commensurate with their military or civilian training.

May administer and grade group tests of intelligence and aptitude and record test data on qualification records. May prepare reports on classification and assignment. May conduct interviews for reclassification and assignment of enlisted personnel.

Must be familiar with all regulations, manuals and procedures pertaining to Army classification and with methods of punching, coding, and maintenance of officers' and enlisted men's qualification records. Should be familiar with the requirements of all jobs in the unit to which assigned.

Suggested Substitutes

262 Occupational Counselor

289 Personnel Consultant Assistant

PERSONNEL CONSULTANT ASSISTANT (289)

Psychological Assistant

Assists in the adjustment of individual personnel matters of a psychological nature and in the specialized training and rehabilitation of the mentally or physically limited, illiterate and non-English speaking enlisted men.

¹ Military Occupational Classification of Enlisted Personnel, War Department Technical Manual, 12-427, 1944.

Administers and evaluates psychological, minimum literacy, and other individual and group tests. Interviews enlisted men concerning problems of a psychological nature and submits reports of findings and recommendations. Assists classification work of a unit. May assist in the construction and evaluation of psychological tests.

Civilian experience in educational, clinical, vocational, or industrial psychology required.

Suggested Substitutes

262 Occupational Counselor

263 Psychiatric Social Worker

Tests employed in military classification were many and varied. Those developed for Army use have been listed by the Adjutant General's Office.¹

The chief products of the Personnel Research Section—the tests currently authorized and employed in the Army installations—are listed below, arranged according to the level on which they are primarily administered:

1. Tests used for screening men at Induction Stations.
 - a. Qualification Test (Q-1 and Q-2)
 - b. Group Target Test (GT-1)
 - c. Individual Examination (IE-1)
 - d. Non-language Individual Examination (NIE-1)
2.
 - a. Army General Classification Test (AGCT 1c and 1d)
 - b. General Mechanical Aptitude Test (MA-2, MA-3)
 - c. Army Radio Code Aptitude Test (ARC-1)
3. Tests used for assignment and reassignment in training centers and units.
 - a. Apprentice Mechanics Test (TC-14a)
 - b. Auto Mechanics Experience Check List (TC-13a)
 - c. Carpenter Experience Check List (TC-25a)
 - d. Carpenter Test (TC-26a)
 - e. Clerical Achievement Test (TC-24a)
 - f. Clerical Experience Check List (TC-23a)
 - g. Cooking Experience Check List (TC-27a)
 - h. Cooking Test (TC-28a)
 - i. Dictation Test
 - j. Machinist Experience Check List (TC-17a)
 - k. Machinist Test (TC-18a)
 - l. Supply Clerk Experience Check List (TC-29a)
 - m. Supply Clerk Test (TC-30a)

¹ Staff, Personnel Research Section, Classification and Replacement Branch, Adjutant General's Office, *Some Aspects of the Relationship Between Personnel Research and Clinical Psychology in the Army*, *J. Clin. Psychol.* 1945, 1, 110-111.

- Important additions to this list are the revised AGCT, AGCT-3a, and the approved use of the Rorschach technique, Army Preference Record, Bellevue-Wechsler Scale and the Army Wechsler, and the General Educational Development Test.

Nearly all Army tests are similar in nature but differ in content and purpose. Objectivity and simplicity of instructions are the rules with items based as often as possible on military problems and situations. Most tests were designed for administration to large groups by examiners who were trained for the test but were usually not professional psychometricians. Standard scores based on a mean of 100 were obtained for nearly all tests.

The best known test in the Army was the AGCT, administered to all literate recruits at reception centers. All forms required about 1 hour for instructions and examining and were usually machine scored. They covered areas of vocabulary, arithmetic, and block counting and were arranged in ascending order of difficulty with a very high ceiling. Raw scores were transmuted into standard scores as follows: (TM 12-425, Par. 19)¹

Standard scores	Army grade	Qualitative level
130 and above.....	I	"Men in this grade possess a high level of mental ability."
110-129.....	II	"Nearly all of these men are capable of performing the skilled administrative and technical work of the Army."
90-109.....	III	"This is the largest group in the Army. These men are of average mental ability."
60-89.....	IV	"These men are below average in their ability to learn new tasks and somewhat slow in their grasp of situations."
59 and below.....	V	"Although these men are very slow learners, and not quick at grasping situations, they can perform adequately on many jobs."

The second most widely used Army classification test was the Mechanical Aptitude Test. Several forms consisting of three parts were developed measuring understanding of mechanical movements, surface development, (patterns and forms), shop mathematics, mechanical information, mechanical comprehension, and tool recognition. Raw scores were converted into standard scores, and Army grades corresponding to the distribution on the AGCT were given.

All men who scored above 60 (later raised to 85) on the AGCT were given the Radio-telegraph Operator Aptitude Test (ROA). The test was reproduced by phonograph records, and examinees were required to determine and check whether pairs of numbered sounds were identical or different.

¹ Personnel Classification, *War Department Technical Manual*, 12-425, 1944.

No other classification tests were administered to the total Army population. More detailed information on these and other tests may be obtained from TM 12-260.¹

The Army Air Forces had need of additional tests primarily for the selection of air-crew personnel. The proper selection of such personnel was well stated by Jenkins.²

Perhaps the best key to psychological problems in aviation is offered by the opening sentence in a foreign flight-manual which reads: "It must be remembered that flight is an unnatural activity in man." True when it was written, it is more than ever true today. Today one must help to select and maintain men who will operate machines in three dimensions, machines that will climb too fast, accelerate and decelerate too rapidly, rise too high, operate under great extremes of temperature, fly when men cannot see, and cover an enormous amount of space during the period of a simple reaction-time. In warfare this is further complicated by the fact that enemies on the ground, on the sea, and in the air are quite likely to make lethal gestures during any of the maneuvers named.

. . . The airplane, in other words, has changed beyond recognition from the simple "flying kite" of 1918; but it still must be piloted by a man who appears to have changed in no important essential from the driver of the first wheeled cart.

According to the report of the Office of the Air Surgeon³

The purpose of this extensive use of psychological tests in the Army Air Forces is to select from the many applicants those men who are best fitted for aircrew training and to assign each of them to the type of training for which he is most suited. Through such a program the Army Air Forces secures a larger number of men who possess the psychological requirements for becoming first rate pilots, bombardiers, and navigators, and at the same time greatly improves the efficiency of the aircrew training program by reducing training wastage.

The most widely used of the Air Forces tests was the Aviation Cadet Qualifying Examination,⁴ a power test of approximately 150 items. With a 3-hour time limit, it was administered to more than 1 million men, civilian and military. Fifteen different forms had been prepared by April, 1944, each an improvement over its predecessors. All items were experimentally selected for validity with the most emphasis

¹ Personnel Tests, *War Department Technical Manual*, 12-260, 1912.

² Jenkins, John G., *Selection and Training of Aircraft Pilots*, *J. Consult. Psychol.*, 1944, 5, 228-234.

³ Staff, Psychological Branch, Office of the Air Surgeon, *The Aviation Psychology Program of the Army Air Forces*, *Psychol. Bull.*, 1943, 40, 759-760.

⁴ *Ibid.*

placed on pilot aptitude. The test was developed for rapid selection of air-crew specialists because of time pressure, unavailability of sufficient college trained personnel, and to make objective examining possible without professional examiners. Early correlation with the AGCT was .62 but later was reduced to .44 to .47. As both tests had high reliability coefficients, they appear to measure different but related abilities.

Types of items on this test included general vocabulary, technical vocabulary, reading comprehension, current events in aviation and the war, pilot aviation interests, bombardier aviation interests, navigator aviation interests, avocational interests related to aviation, driving information, planning circuits, hidden figures, point distance, path distance, mechanical comprehension, judgment, mathematics, and interpretation of data. Of these, general vocabulary, technical vocabulary, current events, bombardier and navigator aviation interests, planned circuits, point and path distance, mathematics, and interpretation of data disappeared from final forms, while reading comprehension, pilot aviation interests, hidden figures, and mechanical comprehension proved most valid. Mechanical comprehension appeared to be the most useful single-type item.

Aviation cadets were given a series of approximately 20 different classification tests requiring 2 days. On the first day cadets took pencil and paper tests and on the second day, apparatus tests.

Prior to October, 1943, applicants who passed the ACQE entered basic training followed by 5 months preflight college training, then went to a classification center for psychological tests and assignment to a type of training according to aptitude scores, preferences, and quota requirements. This resulted in training many men who were later disqualified. Subsequent to October, 1943, the classification testing was done at basic training centers, and examinees who failed were eliminated without college training.¹

A systematic effort has been made to develop for inclusion in the classification battery, tests for all of the skills or abilities that have been found to be important for the various aircrew duties. The types of tests that are now used can be more complex in nature. A general description of the different types of tests in use during 1943 up to October follows:

(1) *Tests of intelligence, judgment, and proficiency.* The classification battery included several tests of mathematical and numerical ability and a test of the ability to read and interpret technical information. In addition, certain tests were used to measure specific knowledge and information in some

¹ *Ibid.*

of the technical fields that are important for various aircrew specialties. Mechanical comprehension and mechanical information tests were included.

(2) *Tests of alertness, observation, and speed of perception.* The classification battery included tests which measured the ability to make certain accurate and rapid fire observations. These tests included questions pertaining to the perception of information contained in maps, photographs, tables, charts, and scales. All of these tests were constructed so that they contained material that was related to the perceptual problems that cadets meet in flying. Special studies were conducted concerning the scoring procedure for such tests, and the relative importance of speed and of accuracy was reflected in the use of speed and error scores.

(3) *Tests of personality, temperament, and interest.* The interests of the Aviation Cadets were assessed through the use of direct preference scales and the use of tests of information and other indications of active interests. One test was included in the classification battery that required the individual to perform a task without becoming confused, tense or unduly upset when he was faced with various distractions.

(4) *Tests of visual-motor coordination.* A number of psychomotor tests were used to test visual-motor coordination. Each cadet was examined on a special piece of apparatus although the tests were set up in such a way that one examiner, operating a central control table, could test a group of four men. The timing of all tests and the recording of scores was effected automatically and objectively through use of a central control table. The classification battery included six different apparatus tests measuring visual-motor coordination and motor skill.

Three scores were determined for each cadet: Pilot aptitude, bombardier aptitude, and navigator aptitude. These were arrived at by a weighing of the various portions of tests according to their predictive value for one type of aptitude; i.e., a given factor measured is of major importance to the pilot but unimportant to the navigator. It is accordingly weighted heavily in measuring an individual's pilot aptitude score and weighted zero in measuring his navigator aptitude score. The preference of the cadet is also included in the total score.

Testing of this type depends heavily upon research. Important problems are

1. *Analysis of duties and functions.* Job analysis must be made of the different aircrew assignments to learn the psychological functions involved in operational and combat flying. Analysis of the functions and hypothesis as to the types of tests which will predict proficient performance in them is a major psychological research problem.

2. *Modification or invention of testing procedures.*

3. *Refinement and improvement of tests.*

4. *Validation of tests.*

5. *Determination of efficient batteries (intercorrelations).*

At a later date the AAF Training Command reported data on the

extent of testing and of elimination by testing of potential Air Force officers.¹ Four thousand candidates were tested on the ACQE per week for the year prior to October, 1943; by December, 1943, 15,000 trainees had been tested; between July 1, 1943, and June 30, 1944, approximately 338,000 men were tested with the classification battery.

TABLE 181.*—PERCENTAGE ELIMINATED AT VARIOUS SCORES†

Pilots			Bombardiers			Navigators		
Sta-nine	Total number	Per cent elim.	Sta-nine	Total number	Per cent elim.	Sta-nine	Total number	Per cent elim.
9	14,682	5	9	167	8	9	1,154	5
8	15,286	9	8	357	12	8	949	12
7	24,367	14	7	769	11	7	877	20
6	30,066	20	6	1,388	17	6	733	30
5	31,091	30	5	640	22	5	176	55
4	22,827	40	4	498	26			
3	11,471	54	3	482	31			
2	2,239	68	2	179	29			
1	904	79	1	42	50			
Over-all eliminated		25			19			

* Table based on consolidation of tables. Percentages are approximated from bar graphs in original manuscript.

† Including those eliminated for unsatisfactory progress, fear, own request, or administrative or physical reasons, air-sick or killed.

Minimum qualifying scores on their respective scales were established as 6 for pilots and bombardiers and 7 for navigators. "The determination of these qualifying scores is a complex matter which involves many considerations. Not the least of these springs from the fact that the qualifying scores must be so balanced as to qualify a sufficient number of trainees for each aircrew specialty. A general trend in minimum qualifying scores has been one of progressively cutting off more and more individuals, until about one-half of the applicants who are now tested qualify for one or more of the aircrew officer specialties." Scores were expressed on a scale, each point of which represented a one-half standard deviation unit of a normally distributed group. The term "stanine" was coined for these units.

¹ Staff, Psychological Section, Office of the Surgeon, AAF Training Command: Psychological Activities in the Training Command, AAF., *Psychol. Bull.*, 1945, 42, 37-54.

Statistical evidence indicated that less than 5 per cent of pilots with highest aptitude-test scores were eliminated, while almost 80 per cent of lowest aptitude scores were eliminated (see Table 181).

MAJOR PROBLEMS IN CLASSIFICATION AND ASSIGNMENT

Unfortunately, not all men inducted were capable of ready classification and assignment. As indicated earlier, illiterates, if they were reasonably intelligent, were inducted. Men with histories of psychosis, prepsychotic tendencies, psychopathy, enuresis, immaturity, or psychoneuroses sometimes slipped through the induction screening (and some made valuable soldiers). Some who had shown previously no obvious traits of maladjustments broke under the strains of Army life. All these complicated the work of fitting men into most suitable military jobs. Those who proved incapable of adjustment were discharged as unsuited for training. Many were placed in special training units, developmental battalions, rehabilitation centers or similar training commands that combined military training, academic training, and psychotherapy.

The Special Training Unit in the Army was designed to bring educationally, physically, or emotionally handicapped men to a high enough level to absorb necessary training and perform certain Army jobs. As described by Seidenfeld, these units conditioned many men for soldiering.¹

Within the military services there are a sizable number of men who are moderately physically handicapped, some who are on the dull side mentally, and still others whose learning is retarded due to lack of acquaintance with the English language. Such men, however, are capable of giving a great deal of useful military service provided they are trained to execute the duties assigned to them. This means that each man in these categories must be given some specialized form of training prior to, or concurrent with, his regular military instruction. Obviously, such training requires more time than normally allocated to basic military instruction within the Army. This additional time for training and the special program of instruction is provided by the establishment of an educational program designed specifically for Special Training Units. Men assigned to such units, in addition and prior to regular training, take from eight to thirteen weeks special training during which half-time is devoted to academic instruction in the fundamental subjects of reading, writing, and arithmetic, and the remaining half to that instruction in the basic military subjects. . . . The evidence indicates that with present techniques about 95 per cent of all men sent to special training successfully complete their instruction and go on to regular training.

¹ Seidenfeld, Morton A., Lt. Col., AGD, The Special Training Units of the Army, *Psychol. Bull.*, 1943, 40, 279-281.

Special Training Units concentrated primarily on illiterate inductees. Mental hygiene units for the emotionally maladjusted were developed at a number of installations. In most cases they were directed by a psychiatrist who worked in cooperation with psychologists and others. Ebaugh has described such a unit.¹

Psychiatric services were set up in replacement training centers where inductees go for basic training after they have been inducted and have spent several days in reception centers being classified and tested to determine correct placement and service. The replacement training center afforded much opportunity for excellent preventive mental hygiene work, in addition to elimination of those unstable soldiers not rejected at induction centers.

Ebaugh reported neuropsychiatric functions at the replacement training center conducted by psychiatrists working with psychologists, psychiatric social workers, chaplains, judge advocates, military police, and classification and orientation officers. Treatment and diagnosis were afforded to ambulatory patients and referrals made to the rehabilitation unit. Group psychotherapy was afforded by talks to troops on such subjects as fear, discipline, sex, war issues, drinking, recreation, fatigue, anxiety, and officer-soldier relationships.

A common example of effective work in RTC's was the treatment of homesickness evidenced either by a depression in which the men affected were aware of the cause, or by apathetic behavior by pre-occupied men showing no emotional disturbance and appearing satisfied but continually thinking of home with no idea of how these thoughts prevented their adjustment. Such men were absent-minded, slow, inefficient, careless, untidy, and unreliable. Usually, one interview sufficed to correct the problem, and in all cases a better adjustment appeared after a few such interviews.

Lipkin² summarized his work as Personnel Consultant in a rehabilitation center, which was, as the name implies, a military installation designed to rehabilitate men who had failed to adjust to Army life. Men sent to rehabilitation centers have been convicted of general court-martial offenses but were considered capable of rehabilitation. Lipkin's duties included the following activities:

1. Conducting a program of group psychotherapy to
 - a. Reduce emotional tensions present among the rehabilitees.

¹ Ebaugh, F. G., Misfits in the Military Service, *Diseases of the Nervous System*, 1943, 4, 3-8.

² Lipkin, S., The Personnel Consultant in an Army Rehabilitation Center. *Psychol. Bull.*, 1944, 41, 524-531.

- b. Develop social and personal values more akin to those of the average soldier.
 - c. Assist rehabilitees to a better understanding of self and others.
- 2. Carrying on a program of personality testing to
 - a. Enlighten both the Personnel Consultant and his enlisted assistants as to the nature and types of personality difficulties and personality structures possessed by rehabilitees.
 - b. Measure changes in attitudes and anxieties resulting from the program of group psychotherapy at the center.
- 3. Acting as Personnel Consultant to the Commandant and other officers of the Center on matters pertaining to group and individual rehabilitee morale and development.
- 4. As Classification Officer carrying on duties common to all Classification Officers but with the major function of recommending assignment when rehabilitees are considered ready for restoration by the administration.
- 5. Scheduling a lecture program for guard and custodial personnel to give them a better appreciation of the problems they face in their relationships with rehabilitees as well as means to solve these problems.

SPECIALIST TRAINING

As might be expected, many men came into the services endowed with more than average abilities, qualities of leadership, and other favorable traits. To exploit these was a more critical objective than the upgrading of the unfavored. Several opportunities were available to exceptional men: to receive training as highly skilled specialists, as in the radar training program of the Navy; to pursue officer-candidate courses leading to commission; or to work toward either of these ends through the Army Specialized Training Program or the Naval Reserve Training Program.

Numerous Service-conducted specialist courses were set up by each of the services ranging from a few days refresher training to accelerated courses requiring months to complete. Most common were courses for mechanics, cooks and bakers, radio operators and technicians, and in aircraft maintenance.

Officer-candidate schools selected outstanding volunteers who aspired to commissions. Their programs were of varying length beyond the minimum of the "ninety-day wonder." Training was an exaggerated basic training combining required leadership abilities with specialized training in the weapons or instruments of the service. Men selected for Army OCS were required to have an AGCT score of 110 or better and be recommended by individuals and boards of officers who examined them on attitudes, information, and personal qualities.

Selection played a large part in the determination of eligibility for

the Army Specialized Training Program or Navy Reserve Training Program, both at the college level. The Army required an AGCT score of 115 or better, high-school graduation, and recommendations of merit. Naval units required similar standards, even more rigid, as the Navy program led to a commission, while the ASTP did not necessarily do so.

In all these special educational opportunities, including that of the Air Force described above, eligibility was based on ability of individuals to profit from training and, in return, to render more valuable service thereby. Selection was determined by previous training, aptitude, preference, personality factors, and the needs of the service. Most important, however, was aptitude.

Undoubtedly, every member of the armed forces faced at some time in his military career a choice between security and danger, in which security could be obtained by failure to demonstrate maximum ability. The extent to which resort to affected incapacity influenced such decisions will never be determined, but opportunities to escape service, to avoid arduous assignments, to obtain release, or to obtain disability discharge with pension eligibility were certainly not always overlooked.

Malingering, or "goldbricking," was a serious problem for psychological workers, especially at induction stations, training camps, in combat units, and in hospitals. Its detection is not easy in most cases and seemingly impossible in many. It is probable that the out-and-out malingeringer who deliberately and premeditatedly feigned illness or inflicted wounds on himself was rare. Similarly, few cases have been observed or reported in which purely fictitious incapacities were feigned. Most commonly, malingeringers exaggerated some existing defect with varying degrees of insight into their frauds and with more or less adequate rationalizations for it. The selectee who was loath to leave his home and his war-industry wages faced a strong temptation to present his slight myopia as extreme and might go about the induction with a peering look, bumping into door cases and stumbling over benches. The soldier who actually wrenched his back in a jeep accident might report excruciating pain despite lack of X-ray evidence of skeletal injury. Only the most realistic and objective individual will fail to convince himself in time that the role he is playing is not the true state of affairs. If he is thoroughly convinced, of course, he is not a genuine malingeringer, nor is he a good military risk.

Hunt and Older¹ reported detection of malingeringers through use

¹ Hunt, W. A., and Older, H. J., Detection of Malingering through Psychometric Tests, *U.S. Naval Med. Bull.* 5, 1943, 1318-1323.

of a test battery composed of arithmetic reasoning, easy directions, and the Kent EGY. They reported that malingerers, as compared with defectives, completed more items with more incorrect responses, passed more difficult and failed more easy items, used more difficult words and phrases, and censored their errors; *i.e.*, malingerers rarely made the common feeble-minded error of stating that there are 48 stripes in the flag.

Evidence indicated malingerers as unable to estimate the true level of the genuine defective, showing, instead, glimpses of natural ability accompanied by obviously gross errors that the defective would not make.

A major obstacle to ideal classification and assignment in the armed forces has always been the changing needs of the service and the resulting calls for reallocation of men.¹ In the Army the system of placement was based on the needs of the various arms and services over certain periods. Because of a coming operation, a large number of men might be needed in a certain corps; the quota had to be filled from the groups of men then being inducted. This meant that a man might be placed in a field of his second choice rather than his first. In most cases corrective reassignment of such men was made during the first months of training, but assignment according to need remained a military necessity. Some of the men classified for training in a corps were in turn selected for other quotas as officers or specialists to provide the skills needed in the operation. If the quotas for a certain service remained high over a period of time, the average caliber of men assigned to that service tended to drop. As this occurred, men selected for specialist training tended to be of lower caliber, with the result that the populations of groups in the same type of training varied, at times, widely.

This frequent conflict between the quality of men desired for a type of training and the men available required that either men of lower aptitude be accepted or fewer men be taken. In the majority of cases, only men in grades I, II, and III on the AGCT were selected for training as specialists, while men in grades IV and V supplied the need for basic soldiers. Exceptions were made for men with civilian experience needed in the Army who were assigned to that job regardless of AGCT score. In many cases a high score on an aptitude test was the basis of selection for training regardless of AGCT grade.

¹ Staff, Personnel Research Section, Classification and Replacement Branch, Adjutant General's Office, Personnel Research in the Army: III. Some Factors Affecting Research in the Army, *Psychol. Bull.*, 1943, 40, 271-278.

CONDUCT OF PSYCHOLOGICAL WARFARE

The use of psychological devices in warfare is as old as the history of conflict. The savage daubed his face to terrorize his adversary. "Divide and conquer" techniques are recorded in the Old Testament. Modern warfare has developed few new procedures but has systematized and expanded the old ones.

Basically, the techniques of psychological warfare take two directions: assault upon the fears, suspicions, and weaknesses of one's enemy; and the cultivation of one's own strengths and correction or concealment of weaknesses. The psychological attack upon the enemy has come to be known as "war of nerves" and the self-strengthening endeavor as morale building:

WAR OF NERVES

Psychological assault may precede conflict or accompany it. History of recent years shows such preparation for the Second World War began years prior to open fighting with the dissemination of propaganda designed to cultivate sympathy for the have-not nations. Nazi Germany proved especially adept at such propagandizing.

Various techniques are employed, more or less subtly disguised. Chief among them have been

1. Data gathering in the enemy territory to learn his strengths and weaknesses.
2. Cultivation of trust and confidence so as to facilitate such data gathering and allay suspicion.
3. Spreading of rumor in the enemy territory, such as achievement of world peace by head-hiding gestures rather than by eternal vigilance; cultivation of local intolerances, even by the committing of overt acts to cast disfavor on a government, party, race, or religion; promotion of internal dissensions; excessive self-criticism, or defeatism. A review of our history during the interim period between 1918 and 1941 will show how we very earnestly subscribed to isolationism, misguided peace movements, national cynicism, disrespect for institutions and traditions, and related strength-sapping fallacies. Often these were motivated by man's most beautiful ideals but nevertheless served our potential enemies better than ourselves.

Only the naïve student would credit all these activities to enemy propaganda. In the conduct of psychological warfare, the psychologist need not attempt to cultivate new distrusts, arouse new suspicions, or turn hatred upon the well-beloved. Instead, he merely selects existing fears and purposes. In any nation he has but to fan

certain flames and smother others to make the fire burn where he wants it, the fuel being supplied locally.

4. Fostering of defeatism, disillusionment, despair, weariness, and cynical appraisal of war aims.

5. Promising a benevolent compromise. All adversaries of the Second World War poured leaflets, radio broadcasts, and underground rumors across the battlelines promising co-prosperity spheres and generous treatment of prisoners.

MORALE BUILDING

Psychological warfare seeks to divert the enemy from his purpose. It also seeks to bolster national zeal at home and at the front. "Morale is the capacity to stay on the job—especially a long, hard job—with determination and zest. It is the opposite of apathy."¹

Troops with low morale fight poorly, quit readily, and experience relatively more casualties than troops with high morale. The development of morale is a problem for the military psychologist depending upon a great many factors, some of which are intangible and seemingly immeasurable, at least in their proper proportion. Basically it appears to depend most heavily on the factors of vitality, motivation, and self-confidence.

The National Research Council Committee on Psychology for the Fighting Man stated that morale building is a primary task of leadership and offered the following rules to military leaders²:

1. Make each man feel he is needed by his unit, that his job in it is important.

2. Never let a man forget that he is a soldier and that a soldier of the Army of the United States is an important and respected person.

3. Make it clear that the unit has its own important function in winning the war.

4. Encourage the expression of pride in the achievement of the unit.

5. Give commendation and encouragement when it can be sincerely and appropriately given, for fair appreciation usually works better than condemnation.

6. Never belittle or humiliate a man in front of others except when a military emergency, as in battle, may require quick correction. When a rebuke is necessary, do it in private, and make it clear that it is the act that is punished, not the man.

7. Keep idleness at a minimum, but make recreation possible.

¹ *Psychology for the Fighting Man*, p. 240, National Research Council, Washington, D.C., 1943.

² *Ibid.*, pp. 242-243.

8. Train each man in every useful task and action that actual combat will require and teach him that these habits will reduce his fear when combat comes, as well as make him a trained and able fighter.

9. Let men work together in groups whenever possible, because the social relation increases effectiveness.

10. Let the soldier on isolated duty feel that he is an indispensable man, not a forgotten one.

Underlying this kind of leadership are more basic factors. The fighting man must be fit to fight; possessed of a spirit of adventure, physical stamina, freedom from fatigue, disease, and boredom; and as comfortable as possible under the circumstances. He must also be motivated to fight by an understanding and appreciation of the war issues and the stakes involved in victory or defeat. Despite pious protests to the contrary, he must hate his adversary if he is to fight to the death. The fighting man must also possess a high measure of confidence in himself, his unit, and his nation. The ideal soldier believes, is certain, that he "belongs to the best unit in the best service, of the best nation." He knows his weapons are the best, his equipment unexcelled, and his leaders wholeheartedly devoted to him as a man and to the nation. Insofar as he doubts any of these values, his fighting spirit is deadened.

Military psychologists have sought to inculcate the proper motivation, vigor, and self-confidence by such means as

1. Repeated emphasis upon issues of the war and necessity for total defeat of the enemy.

2. Deliberate and planned counterpropaganda to combat that issued by the enemy. Interestingly, the naïve character of some enemy propaganda has been so obvious that its uncensored release without comment has been convincing evidence of its violent distortion of the truth.

3. Provision of the best equipment and weapons, and exhaustive familiarization training in their use.

4. Explanation, insofar as possible within the limits of security from espionage, of military plans and procedures. Commanders who were able to fully brief men in advance of missions as compared with those who, from choice or necessity, led combat teams uninformed as to their mission, secured such strikingly better morale that the War Department directed such briefing be afforded whenever possible.

5. Provision of the best possible accommodations for men in the form of food, clothing, shelter, mail delivery, entertainment, and post-exchange privileges. Mess and mail have often been called the most important factors in individual morale.

6. Correction so far as possible of grievances raised by soldiers and a sympathetic reaction to those uncorrectable.

7. Time scheduling so that each man's day is filled with work or recreation, that boredom and inactivity are at a minimum.

8. Appreciation of the soldier's natural desire to escape the service periodically, thereby providing a liberal pass and furlough policy.

9. Justice in the trial and punishment of offenders, defense of the unjustly accused, and opportunity for the nonchronic offender to rehabilitate himself.

10. Provision of the most comprehensive and efficient medical service possible for the sick and wounded.

11. Maintenance of as democratic relationship as possible between officers and men.

12. Provision of opportunities for promotion, commendation, awards, and decorations for personal initiative, sacrifice, and valor.

13. Provision of counseling and assistance in personal affairs or legal matters.

14. Recognition of interests and capacities as well as military necessity in classification and assignment.

15. Assistance to individuals in their adjustment to military life by extensive orientation, preventive mental hygiene, and individualized attention.

Adjustment to Military Life.—Military life has certain advantages and disadvantages when compared with civilian life. These factors combine in each individual recruit with his past experience and personality traits to make his transition easy or difficult.

Most commonly cited advantages of military living include security, in the form of assured food, clothing, shelter, orderliness, and system, and the protection of institutional membership. Other advantages are, according to the motives of the individual, freedom from responsibility or opportunity for advancement; increased income for some men; abundant companionship; travel and excitement mixed with periods of routine activity; assurance of masculinity; and, for older men, recaptured youth; opportunity for heroism and martyrdom; release from unhappy marriage or family ties or from monotonous jobs; freedom from certain puritanical standards not exacted by the realistic code of the Articles of War. There is also in war for the psychopath or potential homicide a psychic release not available in peacetime.

On the opposite side, military life has corollary disadvantages including destruction of established securities in family, profession, and civilian society; loss of individuality and privacy; forced association with large numbers of strangers possessing widely differing interests;

curtailment of luxuries and privileges; enforced discipline; limited income, for most men; enforced cooperation and group action as opposed to competitiveness on the individual level; plus the many irritations of waiting in line, uniform regulations, bed check and reveille, "KP", saluting, eating from a mess kit, sleeping on the ground, carrying a heavy pack, wearing G.I. shoes, and the undemocratic aspects of RHIP (Rank Has Its Privileges) or, in the language of the soldier, "chicken." Above all, there is in wartime the constant threat of injury or death.

In such a pattern of pros and cons the recruit is certain to experience confusion. Most men effected a satisfactory transition through a limited number of unhappy experiences and came to accept military life with reservations. Some found it to be their preferred career. Others found adjustment impossible and, in spite of the preinduction psychiatric examination, demonstrated traits of maladjustment necessitating their release or, if they revolted too belligerently, commitment to a penal installation or mental hospital.

Each service recognized in its training that recruits experience transition problems and the early weeks of training were devoted primarily to learning and practicing military life. The haste of wartime mobilization made extended programs of orientation and indoctrination impossible. The most rapid adjustment seemed to come when the recruit was obliged, from the beginning, to live the life of a soldier, sailor, or marine. He followed a rigid schedule under strict discipline, his reactions were closely observed by officers and noncoms adept at picking out those failing to conform. Along with military living, lectures, demonstrations, and other means taught him what was expected of him.

A significant psychological contribution to early training has been the establishment, in many centers, of mental hygiene units as described by Farrell¹.

The early period of training, both at the replacement training centers and in tactical units, has been found to constitute a serious hurdle for the new soldier in his adjustment to military life. Commonly, the incidence of mental disorders, particularly the psychoneuroses, reaches the highest peak about the third or fourth week of training. At that time the pressure of training and adaptation shows its most striking effect.

In order to detect these casualties before they become severe and to aid in the adjustment of the more stable individuals who are manifesting minor emotional difficulties, mental hygiene units have been established at replace-

¹ Farrell, Malcolm J., Lt. Col., MC., Psychiatry and Industry: Lessons Learned in the Army, *Personnel Series*, 85, pp. 41-42.

ment training centers under the supervision of specially selected and qualified neuropsychiatrists. These neuropsychiatrists, with the aid of the psychologists and psychiatric social workers, give prompt help to men who display symptoms of maladjustment, and this is also a function of the division neuropsychiatrist. Men are encouraged to consult the neuropsychiatrist voluntarily, and officers have been instructed to watch for those who may be developing neurotic behavior and to refer them to the proper points. The neuropsychiatrist has been used frequently to assist those concerned with training in the principles of mental hygiene so that the new soldier may be able to adapt himself more readily to military life and thus overcome his natural fears and resentments. The Mental Hygiene Consultation Service has demonstrated that it is essential to the Army. Such a service is no experiment at this time. It has proved its usefulness in camps which train up to 50,000 men at one time. Certainly there is a moral here for industry.

Mental Hygiene Lectures

One excellent preventive measure has been a series of mental hygiene lectures for both officers and enlisted men. These have been given at certain centers and recently have been adapted for general use throughout the Army. Lectures cover such subjects as fear, resentments, and homesickness, pointing out that they are normal reactions, and offering specific suggestions for curing them. In addition, officers are being given some understanding of mental mechanisms, so that they not only may recognize their own difficulties in adjustment but also interpret the behavior of their soldiers and increase their own value as leaders.

In Combat

The high incidence of neuropsychiatric casualties is a concern in combat also. In the interests of conservation of manpower, the Army has developed a new program by which it is hoped that larger numbers of psychoneurotics will be salvaged for some type of duty. It is well known that long periods of hospitalization tend to fix the psychoneurotic's attention upon himself, and that he may acquire new symptoms during such periods. Therefore, a plan has been developed whereby psychoneurotic casualties will be actually hospitalized for the shortest possible time and then treated in reconditioning centers by individual and group methods in barracks, in a military rather than a hospital atmosphere. Those who show promise of being able to perform some useful service will be transferred to special retraining units, where they will be trained in military occupations according to their capabilities. The officers and instructors are carefully selected, and neuropsychiatrists, psychologists, and personnel and classification officers will take an active part.

In combat zones it has been found that when neuropsychiatric casualties are properly recognized and treated at forward areas, up to 80 per cent can be returned to combat duty successfully. Here the division neuropsychiatrist has important responsibilities. He has been with the unit during its entire

training. He has indoctrinated officers, especially medical officers, with an understanding of neurotic symptoms and the proper approach to them. He is at a tremendous advantage when his unit goes into combat, is able to give treatment to minor cases within the sound of guns and to evacuate the severer cases to evacuation hospitals. He must recognize those who are desirous of escaping duty and avoid indiscriminate evacuation of those who can be treated adequately in forward areas, since the prognosis is, as a rule, far better if patients are treated immediately, although delay in evacuating cases for which specialized treatment in a base area is necessary may prove disastrous to the patient and harmful to the morale of the unit. Usually the neuropsychiatrist functions at the clearing station where sedatives, rest, and reassurance are his chief aids.

Of cases for which evacuation is necessary, the majority can be treated in the evacuation hospital located only a few miles from the front. The policy here is to treat those who require five days' treatment or less. All others are sent to hospitals removed from the front.

THE ROLE OF THE PSYCHOLOGIST IN THE MILITARY SERVICES

The use of psychological knowledge in warfare is by no means new. Troy was captured by a handful of Greeks who understood certain principles of human behavior and bent them to their own use. The aborigine who daubed his face with awe-inspiring colors and bedecked himself to resemble an inhuman horror was applying a knowledge of human emotions to increase his enemy's fear and bolster his own courage.

The First World War first made use of the professional psychologist as a specialist in a field identified by that name. The Second World War has enormously increased his prestige and the scope of his work.

In the First World War, a few psychologists were commissioned in the Adjutant General's Department and given the responsibility for testing and classification. A few others were commissioned in the Sanitary Corps (the unit that contained most associated branches of the Medical Department) for clinical work in hospitals. In the second war, most officer-psychologists were commissioned in the Adjutant General's Department unless they held reserve commissions in another branch. The AGD was given the responsibility of testing, classification, psychological research, handling of special personnel problems, and, in cooperation with the Medical Corps, clinical testing and therapy in hospitals. Most enlisted psychologists worked under AGD supervision and were trained at AGD schools. Naval-service psychologists operated in a very similar manner under the direction of the Naval Bureau of Personnel. A relatively smaller number were used

but their problems were essentially similar and were met in much the same manner.

Definition of the degree of qualification essential for an Army psychologist cannot be put down at present. Academic background, professional experience, personal qualities, related training and experience and in-service training, physical and age requirements, and the ever-present needs of the service combined to select individuals fitting the following job descriptions as set forth in TM 12-406¹.

PSYCHOLOGIST (2252)

Administers and evaluates individual and group tests to determine intellectual, educational, and personality status of individual, and assists in psychotherapy and guidance. Interviews patient and obtains developmental history and family background; administers pertinent tests of intelligence, vocational and educational achievement, and personality and interest; interprets test results; makes diagnosis of personality adjustment and writes report of findings and recommendations for inclusion in clinical record; aids individual in adjusting to environmental situation, assisting in psychotherapy and guidance. May serve as member of reclassification or disposition board.

Must have thorough knowledge of psychological tests and should be able to make differential diagnosis on basis of test data. Knowledge of abnormal and social psychology very desirable.

Military experience desirable.

Civilian experience in abnormal or clinical psychological practice in a public or private institution, hospital, court, school, or industrial organization essential.

PSYCHOLOGIST, AVIATION (2251)

Under supervision of the flight surgeon of base or unit, conducts or supervises psychological testing for selection and classification of air crew members. Engages in research for design, development, and validation of psychological tests and procedures such as apparatus tests, motion picture tests, and other special tests for classification of pilots, bombardiers, navigators, gunners, and other specialists in the air crew, develops criteria for use in checking psychological techniques against results of selection, classification, and training procedures; conducts research studies on problems of procurement, classification, and distribution of personnel; administers tests and standardizes testing procedures; conducts special studies to determine degree to which use of various training procedures and special training equipment achieves training objective; prepares report of research findings and results achieved by various psychological procedures.

Must have experience in experimental psychology, developmental psy-

¹ Officer Classification; Commissioned and Warrant, *War Department Technical Manual*, 12-406, 1943.

chology, psychometrics, or related branches of applied psychology, including experience in psychological research related to problems of aviation.

Should have a Doctor of Philosophy degree from an accredited college or University, or equivalent training and experience in psychology.

In addition to these jobs specifically labeled "psychologist," Army officers with psychological training and experience were most frequently used as Personnel Consultant (2230), Classification and Assignment Officer (2210), or Vocational and Educational Guidance Officer (2235); while enlisted psychologists were usually classified as Occupational Counselor (262), Psychiatric Social Worker (263), Classification Specialist (275), Personnel Consultant Assistant (289), or Personnel Technician (290).

Subsequent to 1943, the need for clinical psychologists in hospitals, rehabilitation centers, and disciplinary barracks to work in conjunction with psychiatrists received heavy War Department emphasis. Quotas were authorized for the direct commissioning of several hundred enlisted persons with proper qualifications as Army psychologists. The most recently available statement of requirements was published in August, 1945.¹

2. The minimum requirements are—

a. Educational.—Applicants should have a doctorate or master's degree in some recognized field of psychology. As a minimum, a bachelor's degree in psychology is acceptable if accompanied by 3 years of pertinent experience (see *b* (3) below). Graduate studies under ASTP in any of the subjects listed in *b* (4) below will be accepted as the equivalent of no more than 1 year of graduate work.

b. Experience.

(1) *For applicants having a doctor's degree.*—At least 1 year of experience in clinical psychology as a civilian or 1 year of enlisted experience as a Psychiatric Social Worker (263), Personnel Consultant Assistant (289), or Personnel Technician (290).

(2) *For applicants having a master's degree.*—At least 2 years of experience in clinical psychology as a civilian, or 2 years' military experience as Psychiatric Social Worker (263), Personnel Consultant Assistant (289), or Personnel Technician (290), or the combined civilian and military experience of 2 years.

(3) *For applicants having a bachelor's degree.*—At least 3 years of experience in clinical psychology as a civilian, or 3 years of military experience with duty as Psychiatric Social Worker (263), Personnel Consultant or Psychological Assistant (289),

¹ Section II, Circular No. 235, War Department, Washington, D.C. (August 3, 1945).

Personnel Technician (290), or the combined civilian and military experience of 3 years.

- (4) Clinical psychology is interpreted to mean psychological work involving direct contact with individuals or in investigation of individual behavior, adult or child. Such experience should include practice in the administration and interpretation of test data as an aid in the diagnosis of mental illness. Desirable experience includes psychological testing, counseling, guidance, mental hygiene, or assembly and analysis of case histories in any of the following fields: personnel, institutional (prisons and hospitals, etc.), care of mentally or physically handicapped, or teaching of psychology at college level. Pro rata credit will be allowed for part-time work, or experience acquired concurrently with graduate work. Experience totally within the field of welfare work is not regarded as clinical psychology and will be considered partially acceptable only where there is also substantial clinical psychological experience.

The functions of the Army clinical psychologist were defined by Lieutenant Colonel Seidenfeld, Chief Clinical Psychologist, Office of the Surgeon General.¹

It is planned that the larger station hospitals as well as all named and numbered general hospitals will provide clinical psychological services to include:

- a. Aid in the development and administration of counseling for convalescent patients who are expected to return to military duty.
- b. Assistance in the preparation of clinical records insofar as they apply to the use and interpretation of special psychological tests required by the chief of the neuropsychiatric section.
- c. Aid in studies of special psychological problems related to classification and retraining of neuropsychiatric casualties.
- d. Assistance of medical personnel in determining appropriate military occupational specialties of men ready to return to duty, with particular emphasis on the selection of assignments compatible with the individual's physical and mental status.
- e. Performing such other professional and administrative duties in the hospital as will best assist the neuropsychiatrist in the accomplishment of the mission of proper management and disposition of patients.

Other psychologists operated in the Military Intelligence Corps or other branches in the conduct of psychological warfare, such as analysis of enemy propaganda and preparation of materials for morale building for the troops and for the home-front. Still others operated in various

¹ Seidenfeld, M. A., The Clinical Psychological Program of the Army, *Bull. Menninger Clin.*, 1944, Vol. 8, No. 5.

branches in the development of aids and procedures to expedite military training.

PSYCHOLOGICAL AFTERMATH OF WARFARE

Veterans' hospitals are filled to overflowing with the casualties of the wars of the twentieth century. An increase rather than decrease in the burden on society and on the individuals concerned seems inevitable. Wounded men with residual physical disabilities are potential public charges. Equally so are the psychiatric casualties who retain mental or emotional handicaps. In large measure, those men represent only an exaggeration of the problems experienced by every returned service man.

ADJUSTMENT PROBLEMS OF THE RETURNED SERVICEMAN

Transition from civilian to military life has been described as filled with difficulties. No less so is return to civilian life. Profound changes occur in the serviceman who spends many months away from home and in combat. Profound changes have also occurred in the environment to which he returns. Rogers¹ has listed some of the psychological problems faced by the returned serviceman or woman.

1. Vocational readjustment.
2. Hostilities.
3. Disturbances of self-esteem (sense of adequacy, loss of status and labels of "psychoneurotic," and the like).
4. Uncertainty of purpose
5. Combat residuals (restlessness, disturbed sleep, hyper-emotionality).
6. Marital and family adjustments.
7. Adjustment to handicaps.

More specifically, these problems include transition from active, outdoor life to a comparatively stable indoor life; transition, for many men, from adventurous, exciting living to monotonous jobs (as the fighter pilot who became a letter carrier) and for others, leaving monotonous, routine assignments to perform duties requiring new learnings and mental activity and skill; transition from military cooperation and teamwork to competitive individualism; loss of the security of position, assurance of life necessities and the corollary threat of unemployment; discontinuance of the personal welfare interests and responsibilities assumed by officers and military agencies; loss for many men, especially young officers, of posts of responsibility and relatively high wages; return to home situations where the family

¹ Rogers, Carl R., *Psychological Adjustments of Discharged Service Personnel*, *Psychol. Bull.*, 1944, **41**, 689-696.

has learned to live independently and where working wives have often earned more than their husbands ever can earn.

Colonel Evans¹, formerly Chief, Classification and Replacement Branch, Adjutant General's Department, has reported the military appreciation of the problems of the veteran and effort to discharge him with as much aid in transition as possible.

The program has three primary objectives: (1) to prepare a record of current qualifications useful in converting the soldier's military and pre-military experience to civilian fields of work; (2) on the basis of this record, to help him evaluate his own potentialities and to arrive at realistic future plans; and, (3) to give information and qualified counsel on any matters connected with his return to a civilian status.

* * * * *

The first task is to study the serviceman's accumulated records of qualification, and summarize and evaluate them in terms of civilian utilization. Soldiers passing through both reception centers and their home communities have changed since the time of induction. The reception center evaluated the recruit in terms of Army needs; the veteran must be reevaluated in terms of the needs of civilian industry, business, and agriculture. From its knowledge of each component part of every military job, the Army is best equipped to do this. Civilian governmental agencies, local welfare groups, or individual employers can place the man on the specific job. But they cannot know so well the nature of his military duties or skills and the ways in which the skills may be converted to civilian job family groups.

Men being discharged from medical installations will have special problems of rehabilitation and readjustment. A large percentage will find it necessary or desirable to begin new careers in jobs suited to their physical limitations. In choosing these new vocations or in laying out their programs of retraining, they will profit greatly from good counseling and, like other veterans, may discover that Army job experience has opened new paths.

An Army of millions will have millions of individual questions, problems, and plans. Obviously, final answers and solutions will often lie in the future and are beyond the scope of our project. Our goal is rather to analyze the veteran's abilities in terms of civilian needs, give him such information as he requires, and get him started on the right track. It should be emphasized, therefore, that separation classification and counseling functions are to be regarded as preliminary to the work of community groups, schools, governmental agencies, and employers.

The preparation of a record of military-civilian qualifications called for the development of a new form. To this end discussions were held by officers of the Adjutant General's Office and representatives of employers and others who could make use of such a record. After several revisions, we arrived at

¹ Evans, George R., *Preparing the Soldier for His Return to Industry*, American Management Association, Personnel Series, 85, 1944, pp. 8-12.

the present separation qualification record, Form 100. This form has been designed to serve as an official Army introduction to employers, school authorities, and anyone with whom the veteran may have occasion to deal. It shows civilian and military education or training, and civilian and military job experience, and complete Army job descriptions are entered to make clear the exact nature of the duties involved. For the men who may wish to make use of the service-learned skills, conversions are made from his military jobs to related civilian work. The counselor, by reference to the *Special Aids for Placing Military Personnel in Civilian Jobs*, developed in cooperation with the War Manpower Commission, can not only supply these conversions, but indicate the type of additional training which may be necessary and the physical demands made by components of the job family.

Generally, a number of conversions are possible. The civilian jobs are grouped in job families according to the closeness of their relationship to the military and pre-military experience of the veteran. On the Form 100 only those civilian job families for which the soldier's experience and aptitudes appear to fit him are shown.

The information entered on the separation qualification record is gathered by the counselor in the course of the interview, and checked, whenever possible, by reference to pertinent Army records. It will be as accurate as highly qualified interviewers can make it.

The original of the Form 100 is given to the serviceman for his own use. Copies are forwarded to the regional office of the Veterans Administration nearest his home, and to the Adjutant General.

Orientation Discussions

At separation centers and hospitals, orientation discussions are employed to stimulate interest and evoke questions before counseling is begun. Many questions of a general nature can be dealt with in these informal talks; others are referred to the counselor. Further, a questionnaire is used to discover the principal kinds of assistance or information each man requires, so that he can be referred to a counselor especially conversant with the fields in which he is interested.

Counseling Equipment

Counseling interviews are given in private rooms or booths, and a standard "kit" of materials is available to the counselor, including pertinent Army Regulations and manuals, such tools as the "Dictionary of Occupational Titles," oral trade questions, and interviewing aids, "*Special Aids for Placing Military Personnel in Civilian Jobs*," and a shelf of references dealing with every aspect of veterans' legislation, educational opportunities, re-employment rights, labor markets, area information, rehabilitation and placement of the handicapped, and the special functions of national and local agencies offering assistance or information to the returned serviceman.

These materials are furnished to counseling personnel through cooperative

arrangement with governmental agencies, business and industry, labor organizations, and welfare groups. Information is also provided to all centers and hospitals, and kept current, through periodic bulletins from our War Department Office. Files are maintained of names and addresses of agencies and individuals to whom veterans may be referred in their home communities.

Servicemen will, of course, return to all walks of life and a great many will find places in industry. The attitude of an Army psychiatrist toward what industry must do to aid veterans most effectively in transition to civilian life was expressed by Colonel Farrell.¹

What industry can and might do to aid in the solution of these difficulties may be summarized in the following manner:

1. *Adopt selection methods.* The military experience is available to industry and has adequately demonstrated its value.

2. *Anticipate and provide for the many problems which will have to be met.* Insecurity due to neuropsychiatric difficulties is a problem. Unhealthy attitudes shown in resentment, "world owes me living" philosophies, nomadism, etc.

3. *Apply the principles of mental hygiene,* which are based on the two fundamental needs of every person—security and satisfaction. Industry must take a more active part in the field of human relations. Such a program may be aided by:

- (1) A survey of leadership. Incompetent leaders must be replaced by those who are competent. A vast source of leaders who have proved their ability will be available to industry.
- (2) Teaching leaders how to lead. The importance of knowing how to lead men instead of pushing them has been adequately demonstrated. A leader cannot be successful if he expects a man to do what he would not do himself.
- (3) Establishment of mental hygiene consultation services. Military experience has demonstrated their value. This service is a fine example of the old maxim, "An ounce of prevention is worth a pound of cure."
- (4) Orientation of employees to the company. Military experience has shown the wisdom of "briefing" men in the over-all picture. No battle can be won without the fullest cooperation of all the soldiers. To have plans and objectives, together with the reasons, explained insofar as is possible encourages soldiers to feel that they are all members of the team. A feeling of greater security on the part of the individual and again for the company will be realized if the employees feel that they are partners. Much misunderstanding and suspicion can be avoided in this way.

¹ Farrell, Malcolm J., Lt. Col., MC, Psychiatry and Industry. Lessons in the Army, *Personnel Series*, 85, pp. 40-42.

- (5) A system of awards or citations. The recognition and reward of outstanding effort has a stimulating effect on any person. This has long been recognized in the military service and to some extent in industry.
- (6) An organized effort to provide recreation and education. The Army has learned that the value of a soldier can be materially increased by giving him the opportunity to increase his education and fund of general information, and it has been found that this makes soldiers better able to appreciate and understand the problems of their leaders. Industry can learn a valuable lesson from this experience. It should develop its own schemes for the general education of its workers. Education in the Army has stimulated the soldier's mind and helped him take an interest in the more valuable aspects of life. In this manner an opportunity has been offered to servicemen to advance.
- (7) Consideration of and for employees' families and homes. Industry will have to take an interest in employees' personal problems. If industry does not do this itself, it must make certain that these problems are handled efficiently and quickly by acceptable social welfare organizations.
- (8) Medical service. Great strides in industrial medicine were made before the war. Much additional information gained as a result of the military experience will be available to industry.

Numerous agencies have sprung up, even in advance of large-scale demobilization, to counsel and advise veterans and assist them in obtaining benefits available under the G.I. Bill of Rights. Vocational Rehabilitation Service Boards, veterans' organizations, fraternal associations, colleges, churches, and many others sponsor such services. The quality of work that they will do will depend on many factors, the best of which will be the qualifications of the counselors employed. Such counselors certainly need psychological training in order to appreciate the motivation, attitudes, adjustment devices that the veteran will possess.

PSYCHOLOGICAL PREPARATION FOR PEACE

The responsibility of the military psychologist has been defined as participation in the conduct of warfare. As any other citizen and member of his profession, he is interested in peace and aspires for greater human endeavors than efficient destruction of fellow men.

Experience in military psychology indicates that the millennium of peace will be speeded or retarded in its coming by our world-wide ability to accomplish certain basic objectives. These include international concern for assurance of freedom throughout the world rather than for racially, geographically, or politically distinct segments and

the development of means for settlement of international conflicts on a level less violent than the savagery of war.

To lead to this objective, there falls on the professional psychologist the task of further developing and refining principles and techniques by which human energies may be turned most efficiently to the procurement of goods and spiritual values that satisfy basic human longings. More specifically, the psychologist should secure data demonstrating the dignity of all races and the fallacies of supermen obsessions. He should assist in the discovery and evaluation of conflicts and their resolution before they reach the emotional peak culminating in war. It is interesting to speculate on how recent history might have been written had a free press had access to an unprejudiced fact-finding poll, such as the American Institute for Public Opinion, in the Axis countries during the 1920's. Psychologists of the future must persist in the measurement of the will of the people.

The psychologist must further continue to concern himself with principles and devices for the analysis of human capacities and the most efficient manner to relate these capacities with the work of the world. New developments in personnel control, assignment, administration, and training should be available to the armed forces in such a way that they may be quickly and efficiently utilized should another period of rapid mobilization ever occur.

SUMMARY

The use of psychological technique in welfare is as old as the history of conflict. During the twentieth century, these techniques have been refined and expanded on a scientific basis. Psychological assault upon the enemy through carefully planned propaganda campaigns increases his fears and diverts his energies to internal dissensions and defeatism. Men called to military service are classified and assigned to military occupations according to experimentally validated testing and interviewing methods, so that natural and acquired aptitudes are most fully utilized. Modern warfare exacts a heavy psychological toll from the individuals who conduct it. Many cases of neurosis and psychosis occur in war that probably would never have occurred without the shock of battle. Indoctrination for conflict and subsequent care for the psychologically exhausted are major responsibilities for the military psychologist.

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CHAPTER XVIII

PSYCHOLOGY IN CLINICAL PRACTICE¹

Training and Certification for Practice in Clinical Psychology

Diagnostic Methods in Clinical Practice

The Practice of Clinical Psychology in Schools

 The Exceptional Child

 The Mentally Retarded Child

 The Physically Handicapped Child

 The Superior Child

 School-subject Disabilities

 Guidance

 Behavior Problems

The Practice of Clinical Psychology.

 Child Guidance Clinics

 Child Welfare Organizations

 Institutions for the Mentally Deficient

 Penal and Correctional Institutions

 Hospitals

The work of the psychologist in clinical practice is difficult to define and limit because it is concerned with problems of behavior adjustment in every field of human relationship. Clinical practice began with the adjustment problems of children and has expanded into many other areas of human behavior, as research and improved techniques have opened the way. It is essentially service work directed toward the solution of behavior problems. Much of what has been done has not been recorded because of the time and clerical work involved. What records have been kept, in many clinic situations, are in the form of case histories, each different from the other. Such data are inadequate for research purposes because of their incompleteness and lack of controls. Clinical practice is based on techniques proved by research, but much of its effectiveness depends upon the experience, artfulness, and good judgment of the psychoclinician.

The first psychological clinic was established at the University

¹ This chapter was written by Dr. Carroll A. Whitmer, Director of Special Education, Pittsburgh Public Schools, and Lecturer in Psychology, University of Pittsburgh.

of Pennsylvania under the direction of Dr. Lightner Witmer in 1896. The *Psychological Clinic*, a journal edited by Dr. Witmer, records many studies made in the early period of clinical practice. The history of the first clinic, published in a memorial symposium¹ commemorating its thirty-fifth anniversary, indicates that this clinic had a very close relationship with schools and dealt primarily with the problems of children. The term "clinic" was borrowed from medical terminology and implied that the data of psychology could be used for the analysis of behavior, as medical techniques are used for the analysis of physical ills. Some of the fundamental concepts developed in the early years of the first psychological clinic have changed very little. For example, the analysis of the individual's behavior, the study of the environmental forces that impinge upon him, and the use of these data to bring about a desired adjustment in his behavior are still the basic aspects of clinical practice.

The essence of clinical practice is in the identification of the influences that affect a maladjusted individual's behavior and the modification of those influences to bring about a desired adjustment. It is obvious then that the clinical psychologist cannot work alone.² He uses certain techniques developed through psychological research but he must depend upon experts in other fields to furnish information that only they can detect and describe. For example, a behavior problem may arise from a defective physical condition, prepsychotic developments, peculiar relationships in the home, or maladjustment in school. In these situations it is necessary to call upon the services of the physician, the psychiatrist, the social worker, and the teacher respectively to obtain complete information from which a diagnosis of the problem can be made. Effective treatment may likewise require the services of the professional practitioners named above and, in addition, the cooperation of the parents and of the child himself.

The improvement in psychological tests and the more general acceptance of testing in the two decades following the First World War opened the way for expansion of clinical practice in psychology. During this period many clinical psychologists won recognition as regular members of the teams of experts who worked with the mental defective, the delinquent, and the problem child in school. They assisted in the study of the child in guidance and welfare clinics, and some psychol-

¹ Brotemarkle, Robert A., and others, *Clinical Psychology*, University of Pennsylvania Press, Philadelphia, 1931.

² For a comprehensive discussion of professional relationship the reader may refer to Louttit, C. M., *Clinical Psychology*, Harper & Brothers, New York, 1936.

ogists were included on hospital staffs. A few of the more adventurous members of the profession set up clinics of their own. Universities offering training in clinical psychology were generally considered centers of referral for psychological problems.

A clear distinction between the problems in the clinical field and those in related fields is not entirely possible. Clinical practice in the application of psychology overlaps with every other field considered in this book, as well as with other professional areas. In fact, wherever problems in the adjustment of human behavior are considered the clinical psychologist may have a part. If the psychological problem does not suggest the primary reason for seeking treatment, the psychologist may contribute information to be used by the professional practitioner to whom the individual is referred. This situation is common in psychiatric hospitals. The psychologist may assist in the study and diagnosis of the mental condition of the patient, but the physician and psychiatrist carry out the treatment using all the information available including the psychological study. The clinical psychologist should be prepared to take the leading role in the diagnosis and treatment of any problem that is primarily psychological or be willing to contribute his share in the diagnosis and treatment of any problem that has psychological implications but belongs primarily in another professional field.

Some specific problems that belong particularly in the field of clinical practice in psychology will be indicated as the practice in certain areas is described in the latter part of this chapter. In general, clinical practice can be said to be concerned with two types of problems, first, the *direction* of behavior and, second, the *correction* of behavior. In the first type of problem it is the business of clinical psychologists to map procedures for influencing behavior toward desired ends. An example of this type of problem is seen in the provision of special environmental influences for children who have suffered crippling conditions such as may follow poliomyelitis or rheumatic fever. Handicapped children need to be guided so that they may avoid warped personalities that may easily become a counterpart of crippled physiques. The second type of problem, that of correcting behavior, is more frequently referred to the clinical psychologist. In behavior development as in many other fields it is unfortunate that people too frequently allow the tree to grow into an unshapely condition before they begin pruning to develop a desirable pattern. This, for example, is true of most problems in delinquency. If parents understood children well enough to evaluate their reactions and correct minor behavior problems before major delinquencies occur, many criminal careers

would be prevented. The life histories¹ of many criminals show undetected and/or neglected delinquencies in youth.

The widespread acceptance of clinical practice in psychology during the past 10 years has given rise to the formation of associations of clinical psychologists in a number of states. These associations have provided leadership for the definition of the field and have determined qualifications for acceptable membership in the profession.² Although the growth of the profession is continuing, it is now possible to indicate the training needed to enter the profession and to define some of the methods and tools used and some common areas of practice.

TRAINING AND CERTIFICATION FOR PRACTICE IN CLINICAL PSYCHOLOGY

A training program³ for practice in clinical psychology has been outlined by a committee of the American Association for Applied Psychology. This program suggests an undergraduate major in general psychology with related courses in the biological, physical, and social sciences and in education. It is recommended that the undergraduate seek field experience in human relationship such as camp counselor, attendant in institutions, etc.

The recommended graduate program includes courses in basic psychology such as systematic, developmental, experimental, and quantitative methods, as well as study of psychological deviates and learning. The three areas of specific preparation for clinical practice are as follows:

1. Courses in related fields such as medical science, social psychology, and sociology.
2. Study and practice of specific techniques where theory and practice are integrated in measurement, case study, and counseling and the application of remedial and therapy techniques
3. A period of one year of internship in clinical practice in one or more types of institutions of recognized standing under supervision of a clinical psychologist of good standing.

The provision of internship has a most important consideration in

¹ Glueck, Sheldon, and Glueck, Eleanor, *Criminal Careers in Retrospect*, pp.5-6, Commonwealth Fund, New York, 1943.

² Some of the problems that beset a growing profession are well set forth in the presidential address delivered at a meeting of the Pennsylvania Association of Clinical Psychologists. Teagarden, Florence M., *The Art and Technology which Deals with the Adjustment Problems of Human Beings*, *J. Consult. Psychol.*, 1939, **3**, 170-176.

³ Proposed Program of Professional Training for Clinical Psychology, *J. Consult. Psychol.*, 1943, **7**, 23-27.

proposed training programs because the actual clinical work cannot be learned from books. A plan for internship training in its special relation to clinical practice has been described by Symonds.¹ An essential part of this program offers the students an opportunity to observe interviews, examinations, and treatments by means of microphones, which carry the sound from the examining room to the observation room situated behind a one-way vision screen that enables the observer to see but not be seen. The person being observed is not aware that anyone is hearing or seeing the examination. Later the students are given practice in all phases of clinical work under supervision, and case conferences are held so that experiences can be shared.

As the training for clinical practice in psychology has become more definite there is reason to become more concerned about the charlatan, that misguided or poorly trained person who professes to be a clinical psychologist. The activities of such people reflect discredit on the profession because the public does not know the merit of the individual practitioner who calls himself a psychologist. State licensing has been considered in a number of states, but so far no enabling law has been passed. Licensing would protect both the public and the individual who is trained for clinic practice in psychology. A symposium² on certification and licensing appeared in the *Journal of Consulting Psychology* in 1941. The evidence seems to be that, when a specific professional task can be defined, it is possible to define the status of the person who may do it. An article by Britt³ in the symposium describes the legal status of psychologists. Eighteen states had some statutory provisions concerning psychologists and several more states were considering proposals for legislation on that subject in 1941.

The majority of the statutory provisions now existent are concerned with the practice of psychology in schools. Public-school psychologists are certificated by a number of states. The certification for school psychologist follows in general the training requirements appropriate for clinical practice, but usually it either requires too little training or is not specific enough in required courses and supervised practice to ensure adequate training for clinical practice. Among the best of state certification requirements are those of Connecticut, New York, and Pennsylvania.⁴ The certificates in these states require a

¹ Symonds, P. M., A Method of Training Clinical Psychologists for Child Guidance, *J. Consult. Psychol.*, 1943, 7, 41-45.

² Symposium on Certification and Licensing, *J. Consult. Psychol.*, 1941, 5, 49-79.

³ Britt, S. H., Pending Developments in the Legal Status of Psychologists, *J. Consult Psychol.*, 1941, 5, 52-56.

⁴ Copies of certification requirements may be obtained from the State Department of Public Instruction in these states.

minimum of two years of graduate study and some practical experience under supervision. All three of these states offer certificates for psychological examiners with less training than that required for school psychologist.

The local and national associations of clinical psychologists have standards for membership that are higher than most certification standards. At the present time, it is probably fair to say that the best way to determine the qualifications of a person who professes to practice clinical psychology is to determine his membership status in the local or national association of his profession.

DIAGNOSTIC METHODS IN CLINICAL PRACTICE

The methods and tools used in clinical practice vary somewhat with the training and background of the clinician, but the common acceptance of basic procedure determines more or less uniformity in practice in similar cases and under similar conditions. The clinical psychologist is concerned first in making a *diagnosis* of the problem. The general statement of the problem for which the referral is made gives a point of reference for the subsequent investigation, but the diagnosis is a conclusion about the individual's present behavior, abilities, and aptitudes and the environmental factors related to his behavior.

1. The first step in the psychological investigation is to secure information about the individual's *developmental history*, including birth, infancy, early training, and behavior both at home and in school. The family history is important because the influences and attitudes of parents and siblings are part of the history of the individual. Significant points in the family history may be unusual behavior, hereditary patterns of susceptibility to illness, or unusual environmental influences. Skillfully conducted personal interviews with those who know the individual intimately are a most important part of the psychological investigation.

2. Since mental and physical problems so frequently overlap, it is essential to have a general *physical examination* of the clinic subject with particular reference to any physical condition that seems likely to affect his behavior either directly or indirectly. In many cases sensory defects, glandular malfunctions, nutritional deficiencies, dysrhythmic patterns of brain waves, or other general or specific physical conditions are associated with problem behavior. The psychologist does not make a physical examination. He refers the child to a medical specialist, who is trained to evaluate the physical condition of the individual and consult with the psychologist on the probable or possible effect that the patient's physical disability may have upon his behavior. If

the physical condition and behavior maladjustment seem related, medical treatment and psychological treatment may proceed simultaneously. Often medical treatment and correction of a physical disability should precede psychological treatment, but the assumption that physical correction will immediately bring about correction of the behavior maladjustment is usually false because the behavior may be only indirectly related to the physical disability. Treatment for behavior maladjustments may be necessary for long periods of time after physical corrections have been accomplished, even though the behavior may have been correctly attributed to the physical defect.

3. The *psychometric examination* of the individual usually follows the historical inquiry. The psychometric examination is used to make an appraisal of the quantity and quality of the individual's behavior on standardized tests. The performance on tests is used as an index, along with the other information, to estimate the probable limits of development of intellectual capacity and performance in various types of activity.

The most reliable and valid tests¹ that the clinical psychologist uses are individual tests of general mental ability. The Binet Scale was the original test in this category. It is an age-scale test, so called because it presents a number of test items that have been standardized for each age level of mental growth. The Binet Scale has undergone a number of revisions. The Binet-type scales in current use are the Terman-Merrill Revision of the Stanford-Binet² and the Kuhlmann Individual Test.³ The items on these scales are scored in months' credit, and the total credit in years and months is the mental age of the subject who takes the tests. The mental age of the subject is divided by his chronological age, and the resulting quotient times 100 is the intelligence quotient. This quotient indicates the relative rate of mental growth. Both the Terman-Merrill and the Kuhlmann individual scales are extended beyond the average age of mental maturity, so that intelligence quotients may be obtained from the test performance of superior adults.

The Wechsler-Bellevue⁴ scale of intelligence tests for adults has recently gained recognition as a tool in the psychological examination

¹ A comprehensive treatment of mental tests is given in E. B. Greene, *Measurement of Human Behavior*, The Odyssey Press, Inc., New York, 1941.

² Terman, L. M., and Merrill, M., *Measuring Intelligence*, Houghton Mifflin Company, Boston, 1937.

³ Kuhlmann, F., *Tests of Mental Development*, Educational Test Bureau, Inc., Philadelphia, 1939.

⁴ Wechsler, David, *The Measurement of Adult Intelligence*, The Williams & Wilkins Company, Baltimore, 1941.

of adults. This scale provides point values for responses on tests of verbal and nonverbal or performance type and a total point value, so that an intelligence quotient evaluation of different types of abilities may be made. This type of test has an advantage in use with the adult who is limited in verbal ability or practice; and since the test is scaled for adults it avoids the use of the age-growth principle involved in the Binet-type scales, which start with age one or two years.

The nonlanguage performance tests are useful indicators of ability to comprehend and perform problems that do not involve language. One of the more commonly used scales of this type is the Grace Arthur Point Scale of Performance Tests.¹ Such tests are particularly useful in working with foreign-language-speaking children, deaf children, or children who have any language handicap. There are numerous individual tests of this type that are excellent tools in the analysis of individual behavior, particularly in its qualitative aspects. Many tests of the performance type are described by Bronner and others² in a manual of individual tests.

Beyond the basic linguistic and nonlinguistic tests the nature of the problem at hand usually determines the other types of tests to be used in a particular case. The area of personal-social development is becoming increasingly recognized because test developments in this area in recent years have thrown much light on the characteristics of the individual that determine the effectiveness with which he uses his intelligence. A comprehensive description of the test materials in this field was written by Symonds³ in 1931. Since that time the projective techniques have gained wide acceptance among clinical psychologists. The Rorschach method is an example of a projective technique.⁴ It employs a series of standardized ink blots to elicit responses that can be studied to determine various aspects of the subject's personality adjustment. A recent issue of the *Journal of Consulting Psychology* is composed of articles by leaders in the Rorschach method. One article⁵ in this symposium lists a bibliography of 90 titles published since 1934,

¹ Arthur, Grace, *A Point Scale of Performance Tests*, Commonwealth Fund, New York, 1930.

² Bronner, Augusta F., Healy, Wm., Lowe, Gladys M. and Shimburg, Myra E., *A Manual of Individual Mental Tests and Testing*, Little, Brown & Company, Boston, 1927.

³ Symonds, P. M., *Diagnosing Personality and Conduct*, D. Appleton-Century Company, Inc., New York, 1931.

⁴ Klopfer, B., and Kelley, D. M., *The Rorschach Technique*, World Book Company, Yonkers-on-Hudson, 1942.

⁵ Hertz, Marguerite R., 'The Rorschach Method: Science or Mystery,' *J. Consult. Psychol.*, 1943, 7, 67-80.

so it is evident that there is much work being done with this technique.

Other areas of investigation by means of psychological tests include aptitude and interest.¹ These techniques are for the most part limited to problems of adolescence and adulthood, because of the maturity involved in the behavior and interests that are significant in vocational prognosis. Social maturity,² educational achievement,³ and school-subject disability⁴ are additional areas of behavior that are investigated as indicated by the need of the case.

The clinical psychologist should also have access to the psychological laboratory in order to use devices to measure handedness, various aspects of visual efficiency, perceptual ability, and auditory acuity. In some instances it may be possible that some anthropometric measurements may give significant data. Obviously only selected tests or measurements will be used in any one case. There would be no more point in giving all kinds of tests to every problem child than there would be in requiring a complete hospital clinic examination for every person who has a broken bone. The clinical psychologist must determine what tests are pertinent in a particular case and should not waste his own time or the time of other people in using irrelevant tests.

The objective of the clinical examination is the diagnosis. When that objective has been achieved the next step in clinical practice is the answer to the question, "What can be done about it?" The diagnosis is sterile if no treatment follows. The aim of clinical practice is service, and the profession stands or falls on the ability of its members to make practical recommendations. In the remainder of this chapter we shall describe some of the work done by clinical psychologists.

THE PRACTICE OF CLINICAL PSYCHOLOGY IN SCHOOLS

The application of psychology in education was one of the first fields of applied psychology, and the first psychological clinic dealt with problems of children in schools. It is only in recent years that schools have employed psychologists primarily for clinic practice. The school psychologist, however, is not a recent innovation. An article⁵ in the

¹ Bingham, Walter V., *Aptitudes and Aptitude Testing*, Harper & Brothers, New York, 1937.

² Doll, Edgar A., *The Vineland Social Maturity Scale, Revised, Condensed Manual of Directions*, publication of the Training School, Vineland, New Jersey, Dept. of Research, Series 1936, No. 3.

³ Remmers, H. H., and Gage, N. L., *Education Measurement and Evaluation*, Harper & Brothers, New York, 1943.

⁴ Fernald, G. M., *Remedial Techniques in Basic School Subjects* McGraw-Hill Book Company, Inc., New York, 1943.

⁵ Hutt, R. B. W., The School Psychologist, *Psychol. Clin.*, 1923, 15, 48-51.

Psychological Clinic in 1923 deals with the work of the school psychologist. A symposium¹ on the school psychologist in the *Journal of Consulting Psychology* in 1942 describes the many and varied functions of psychologists who practice in schools. One writer² in the symposium describes the work of the school psychologist as primarily educational, rather than clinical, psychology.

The type of work done by the school psychologist depends somewhat upon the organization of the psychological services in the schools, but in this chapter we shall limit our discussion to the clinical phase of his work. The following types of problems of school children are commonly referred to the school psychologist:

1. Problems of the exceptional child, including mentally retarded, physically handicapped, and the mentally superior
2. Problems involved in the analysis and correction of school-subject disability
3. Problems involved in the analysis of abilities for the improvement of guidance
4. Problems of behavior and habit adjustment

THE EXCEPTIONAL CHILD

The identification, classification, appropriate school placement, and continued guidance of the exceptional child is a never-ending task for the school psychologist. Table 182 gives some idea of the extent of the problem of the exceptional child in school.³

TABLE 182.—ESTIMATION OF NUMBER OF EXCEPTIONAL CHILDREN IN NEED OF SPECIAL EDUCATIONAL SERVICE

Blind and partially seeing.....	65,000
Deaf and hard of hearing.....	400,000
Mentally deficient.....	500,000
Behavior problems	750,000
Physically delicate.....	300,000
Crippled.....	100,000
Speech defective.....	1,000,000
Mentally gifted.....	500,000
Total.....	<u>3,615,000</u>

In 1940, 385,180 exceptional children were reported enrolled for special educational services. This represents approximately one-tenth of the need met in any reasonable degree. Handicapped children

¹ The School Psychologist, *J. Consult. Psychol.*, 1942, Vol. 6, No. 4.

² Baker, G. Derwood, What the Public School Needs from the Psychologist, *J. Consult. Psychol.*, 1912, 6, 177-180.

³ *Statistics of Special Schools and Classes for Exceptional Children*, (Vol. II), Chap. 5, p. 6, Federal Security Agency, U.S. Office of Education, 1940.

in regular school classes are most frequently neglected and develop problems because their needs are not adequately met by a curriculum designed for the average child.

The Mentally Retarded Child.—The adjustment of the mentally retarded child presents an acute problem in most schools, and probably because of the obvious misunderstanding and maladjustment these children have been given more of the clinical psychologist's time than any other type of referral. The school psychologist is called upon to determine the degree of educability¹ of the retarded child and to recommend appropriate educational treatment to meet his needs. In several states where specific educational provisions are made for the mentally retarded they are continued in public school, at least until they are sixteen years of age. Specified classes with special curriculum and equipment and specially certificated teachers are provided. The

¹ A definition of uneducability is applied in Pennsylvania and has proved workable. The following criteria adopted by ruling of the State Council of Education are used:

"A child may be excluded from the public schools of Pennsylvania because of severe mental retardation

1. If he has an intelligence quotient of less than 50 as obtained on an individual intelligence examination, supplemented, preferably, by evidence of similar degrees of retardation on scales of performance and social maturity, or
2. If he has an intelligence quotient between 50 and 69 as obtained on an individual examination, supplemented, preferably, by evidences of similar degrees of retardation on scales of performance and social maturity, and has shown in an approved special class his inability to learn to adjust himself in a favorable environment, or
3. If he has an intelligence quotient of less than 75, as obtained on an individual examination, supplemented, preferably, by evidences of degrees of retardation on scales of performance and social maturity, and has clearly shown behavior symptomatic of his permanent inability to learn to maintain himself, without supervision, in a favorable environment.

In certifying to the uneducability of a child, a school psychologist, psychological examiner, or mental clinic shall give full consideration to (a) a competent report regarding the auditory and visual acuity of the child, (b) a medical examiner's report on the nature of the motor coordination of the child, and (c) a thorough qualitative or descriptive report on the behavior of the child in social and educational situations, indicating development comparable to the level shown by the psychological tests used.

Unless these reports on the physical condition of the child and on his behavior show substantial reason for questioning the validity of the results of the psychological tests, the Chief of the Division of Special Education shall approve the application for exclusion."

Children who are declared uneducable by these criteria are excluded from public schools and reported to the State Department of Welfare. The Department of Public Instruction assumes no further responsibility for their training.

psychological problems in these classes involve the adjustment of the whole program of educational treatment to the individual abilities of the children so that they may develop their limited capacities in practical ways and gain the self-confidence that comes through successful performance.

The psychologist is concerned with the interpretation of the retarded child's abilities to the teacher and to the parents. It has been demonstrated that children who are markedly retarded can develop into useful citizens if they are understood and trained within the limits of their capabilities. A survey of the occupations of men and women who had been trained in Pittsburgh Public School classes for the mentally retarded showed that even during the decade 1930 to 1940 many were gainfully employed. The occupations and pay of workers trained in one public-school class for the mentally retarded are as follows:

- Mechanic earning \$100 per month
- Steel worker earning \$100 per month
- Refractory worker earning \$90 per month
- Railroad car repairer earning \$90 per month
- Musician earning \$75 per month
- Cleaner earning \$48 per month
- Janitor earning \$25 per month

Presentation of these data does not imply that *all* mentally retarded children can be trained to be employable. The fact is that *many* are employable and society benefits from the investment in their training.

The Physically Handicapped Child.—The clinical psychologist in schools is faced with many intricate problems in the mental-hygiene adjustment of the *physically handicapped*. The development of a well-adjusted personality in a child whose crippling condition prevents his leading a normal-child life is a very difficult problem. Well-meaning parents and teachers often cripple a child's personality through overzealous efforts to compensate for his inability to live a normal physical life. The child himself may easily become frustrated because he cannot do as other children do. The provision of opportunities to live as normal a life as possible through discovery and development of whatever abilities the child possesses in order to offset the effects of his handicap as much as possible are objectives in the psychoeducational treatment of the crippled child.

The problem of the definition of ability in some types of crippling conditions is particularly difficult because the common tools used for psychological measurement are not appropriate. For example, the measurement of the abilities of the child handicapped by cerebral palsy

(commonly called the "spastic" child) cannot be adequately done because the child's speech and muscular control may be very poorly developed in spite of the fact that intellectual capacity may be very high. The writer can cite one child now fourteen years of age who has accomplished arithmetic habits and reading comprehension at the tenth-grade level but has to be carried from place to place. He gives the general behavior appearance of a very low-grade child because his speech and voluntary muscular control are extremely limited. The psychological measurement of this child was accomplished only through the use of appropriate items from various mental measurements scales in periodic testing and diagnostic teaching. This procedure involves study of the child's abilities least affected by his crippling condition and specific teaching and measurement of accomplishment in those abilities.

The peculiar problems of the child handicapped by cerebral palsy are of particular interest to the clinical psychologist because the relative proportion of spastics among all types of crippling conditions has been shown in various surveys to range from 5.6 per cent to 18.5 per cent.¹ It is only within the past 10 years that the training of the spastic child has been considered feasible. Spastic children were, not many years ago, considered hopeless problems, but modern methods of treatment have proved that many whose injuries are primarily in the motor rather than the associational areas of the nervous system can be markedly improved. Many of these children develop to the point of being able to live quite normal lives. An early prognosis of mental development is especially desirable in the spastic child, because early training may be very effective in helping to reduce the extent of the crippling physical condition. In some cases the cerebral injuries are so extensive that mental growth is markedly retarded, and early diagnosis may save the expense and time in futile attempts at training.

The mental hygiene of the physically handicapped is of particular interest to the clinical psychologist. Restricted physical activity leads to frustration and maladjustment unless outlets for normal childhood energy are found. Outlets for activity may be obtained through channels that are socially desirable if the child is understood and if proper training facilities are provided. The development of feelings of adequacy and worthwhileness can be accomplished and the evidence is apparent in a well-conducted psychoeducational program for crippled children in spite of the fact that studies² of the personalities of handicapped children have shown considerable maladjustment.

¹ Heck, A. O., *The Education of Exceptional Children*, p. 144, McGraw-Hill Book Company, Inc., New York, 1940.

² Pintner, R., Eisenson, J., and Stanton, M., *The Psychology of the Physically Handicapped*, pp. 272-275, F. S. Crofts & Co., New York, 1941.

The Superior Child.—The identification of intellectually *superior children* has been for many years a well-defined procedure,¹ but the determination of the most effective educational program to ensure their maximum development is still in the experimental stage. Sumption² describes a follow-up survey of the major work classes in the Cleveland public schools with some evidence that a particular type of educational provision is at least more effective than the regular school classes in that school system.

The school psychologist is concerned, not only with the identification of the superior child, but also with the educational treatment that will ensure his best possible emotional and social adjustment. Grievous errors have been committed by parents and teachers in promoting irregular behavior growth patterns in superior children through the development of peaks of academic performance at the expense of social adjustment. A warning against this type of handling of superior children was written by Root³ in the early period of the scientific study of the superior child. Root's study indicates that the child who by virtue of his superior academic talent has been promoted far beyond his social age group is likely to be a general misfit. The present trend in educational treatment is to keep bright children placed near their own age group in school grade and to provide opportunities for them to use their superior abilities in special work suited to their talents and interests. Initial psychological study of the superior child and follow-up check of his adjustment and progress are important, because his growth is so rapid that what may have been appropriate educational treatment at one time soon may be quite inappropriate.

SCHOOL-SUBJECT DISABILITIES

The analysis and correction of school-subject disabilities is a clinical-practice field of growing importance in modern schools. Crowded classrooms with less time for individual instruction of each pupil inevitably result in the failure of some children to develop correct habits in the basic school subjects. It is now recognized that all children in the same intelligence range do not have the same aptitudes for accomplishment in school subjects.

Studies of special disability in reading have led to the conclusion

¹ Terman, L. M., et al., *Genetic Studies of Genius: Mental and Physical Traits of a Thousand Gifted Children*, Vol. I, Stanford University Press, Stanford University, Calif., 1925.

² Sumption, M. R., *Three Hundred Gifted Children*, World Book Company, Yonkers-on-Hudson, New York, 1941.

³ Root, W. T., A Socio-psychological Study of Fifty-three Super-normal Children, *Psychol. Monogr.*, 1921, No. 133, 134.

that there are numerous factors associated with reading disability.¹ For example, emotional handicaps, short attention span, lack of environmental opportunities, low sensory capacity, as well as factors of motivation, may all operate, independent of general intelligence, as hindrances in learning to read. On the other hand, there are children who have a combination of abilities that contribute to special reading aptitude. These children may learn to read but may not comprehend what they read.

The clinical study of reading disabilities involves a comprehensive examination of general and specific abilities, analysis of the reading performance if the disability is partial, check of general physical condition and sensory acuity and functioning, and the determination of the child's attitude toward school and especially toward reading. In some cases diagnostic teaching may be necessary in order to determine the faulty habits that impede reading. No longer are we willing to dismiss a difficult case with a diagnosis of "word blindness." Case histories of particularly difficult reading problems are given by Fernald.² Reference to these case histories will indicate some complex behavior relationships involved in the case of the nonreader and the remedial treatment applied. The most effective remedial treatments are those that follow comprehensive study of the child's disabilities. Additional assignments in reading are not a remedy for reading disabilities.

Remedial-reading classes under the direction of a specially trained teacher seem to be the most effective general recommendation for treatment of reading disabilities. The well-trained remedial teacher will apply the particular training technique that fits each individual child's disability, and subsequent treatment procedures will be determined by the changes in the child's behavior. The effectiveness of remedial teaching is shown in a report of a 5-year program in a Pittsburgh school, in which 258 children received remedial instruction and averaged 1 year's progress in each half-year under treatment.³

The analysis of school-subject disabilities other than reading has not presented the complex behavior relationships found in reading disabilities. Special disability in arithmetic is most frequently found to be associated with poor mastery of the fundamental facts of arithmetic or with a lack of understanding of a process that, when recognized, can easily be corrected with simple practice. Mirror writing or

¹ Monroe, Marion, *Children Who Cannot Read*, University of Chicago Press, Chicago, 1932.

² Fernald, *op. cit.*, pp. 273-318.

³ Goldstock, R., *Reading Progress in a Remedial Home Room, Pittsburgh Schools*, 1944, 18, 57-72.

letter reversal in writing is frequently cited as young children begin to learn to write. These difficulties are usually correctable with no more than simple practice of copying, rather than writing from memory, until the correct habits are fixed.

GUIDANCE

The services of the clinical psychologist in schools are becoming increasingly recognized in the problems of *guidance*. Chapter V indicates the general use that the vocational guidance counselor may make of psychological data. In addition to the gross data obtained from group tests there are individual problems that arise from peculiarities in personalities and aptitudes. The work of the guidance counselor may be made much more effective if he has clinic service available for complex individual problem cases. Reasons for referral of individual cases for clinic service may be because of sudden personality changes or marked changes in academic accomplishment or serious problems in motivation. If a high-school pupil has a superior academic record and suddenly begins to fail there is ample justification for clinic study. Lack of motivation in school may be found to be associated with situations that can be remedied when the underlying causes are revealed. Emotional blocking arising through misunderstandings of aptitudes or abilities, coupled with pressure for performance, is often involved in school maladjustment. Sudden changes of personality are likely to be significant signs of maladjustment, particularly at the late adolescent level. These changes may be indicative of prepsychotic tendencies and should by no means be neglected or, even worse, treated by punishment.

BEHAVIOR PROBLEMS

The analyses and recommendations for treatment of *behavior problems* form a very important area of clinical practice in schools. The school clinic may assist the speech correctionist in dealing with the problems of the child whose speech difficulty is related to emotional and habit problems. The stutterer, particularly, may have adjustment problems that, if corrected, would greatly facilitate the mastery of his difficulty.¹ Conduct problems in general, truancy, failure to comply with school rules, habits of deceit, nervous habits, and, in fact, almost any form of antisocial behavior make up the list of referrals for clinic study. Relatively few schools have an adequate staff for study and

¹ An excellent discussion of the personality problems of the child handicapped with speech defect is presented by O. L. Baccus, *Speech in Education*, pp. 115-131, Longmans, Green and Company, New York, 1943.

treatment of all behavior problems. Usually medical, psychiatric, and social-worker services, as well as psychological service, are too limited to do complete child guidance work in schools. Some of the more complex behavior problems may necessarily be referred to child guidance clinics because the basis for the maladjustments may be primarily in the home and the parents as well as the child may be in need of treatment.

The school psychologist who practices with limited allied clinic services in the school should have a working relationship with clinic services outside the school. If such services are available the school psychologist often refers complex problems involving out of school relationships to the cooperating specialists or clinic, along with his preliminary investigation. He also cooperates in the treatment insofar as the school is involved in the treatment plan. A working relationship saves duplication of service and concentrates the available service on the phase of the problem where it will prove most effective.

The following tabulation of problems referred to the psycho-educational clinic of the Pittsburgh Public Schools in 1943-1944 gives a sample of the various types of problems confronting the psychologist in clinic practice:¹

Problems involving academic performance, <i>i.e.</i> , primarily remedial problems.....	60
Problems of behavior maladjustment.....	18
Problems of academic placement.....	19
Problems too interrelated to classify.....	27
Total.....	124

This tabulation represents 124 consecutive cases studied in the clinic. It was impossible to make a clear-cut classification of the problems because many of the children presented very complex difficulties. This classification was based on what seemed to be the primary problem in each case.

Referrals for medical treatment were made in 50 of the 124 cases listed. Twenty-five children were referred to physicians on the basis of the diagnosis made in the school medical clinic, and 19 children were referred to oculists. Since no psychiatric treatment was available in the school clinic, 6 children were referred to agencies where psychiatric treatment was available. The latter figure can by no means be interpreted as a basis for estimating the relative need of psychiatric service because many referrals for such service are made directly from

¹ Whitmer, C. A., *An Analysis of the Services of the Educational Clinic for the School Year 1943-44, Pittsburgh Schools, 1945*, 19, 73-86.

the School Health Department or by the parents. Similarly, the number of children referred from the Educational Clinic to oculists and physicians has no relation to the total of such referrals by the schools.

The future for the clinical psychologist in schools is bright. Such service is now available to only a small proportion of school children in the United States, and, as the school psychologist proves his worth in the cooperative effort to achieve the maximum effectiveness of education in a democracy, his place in that system will be recognized.

THE PRACTICE OF CLINICAL PSYCHOLOGY

CHILD GUIDANCE CLINICS

The psychologist who practices in a *child guidance clinic* is in a field closely related to clinic practice in schools. The types of problems are much the same, but the treatment procedures are likely to be more elaborate than those provided in the schools. The community guidance clinic is likely also to receive the most serious and complicated problems in which the schools may already have failed or passed on to the agency that specializes in treating behavior problems.

Child guidance clinics under the sponsorship of the National Committee for Mental Hygiene are directed by psychiatrists, and, generally, the psychologist functions as a member of the team of psychiatrist, physician, and psychiatric social worker in the diagnostic and treatment program. The psychologist contributes the psychometric analysis, analysis of school-subject disabilities, and qualitative observations of the child's behavior. The information contributed by each member of the professional team is pooled to determine the diagnosis and the treatment program.

The treatment program in the guidance clinic may involve one or all of the members of the professional team who contribute to the diagnosis. The psychologist's part in the treatment program consists of diagnostic and remedial teaching or parts of the therapy under the direction of the psychiatrist. Psychologists often serve in play-therapy programs. Play therapy is a technique designed to give the maladjusted child an opportunity to express his emotions and feelings through his treatment of various types of toys. A detailed account of this type of treatment is given by Levy.¹ The assumption is that the child releases emotional tensions that would otherwise increase his problem behavior in his responses to other people.²

¹ Levy, David, Hostility Patterns in Sibling Rivalry Experiments, *Amer. J. Orthopsychiat.*, 1936, 6, 193-257.

² Many other forms of clinical treatment are described and evaluated by

Some guidance clinics are primarily psychological rather than psychiatric, and the leading role in the interpretation and treatment program in these clinics is taken by psychologists. One of the oldest guidance clinics in America, The Wichita Guidance Center,¹ is of this type. This Center was organized in 1930 by Dr. Edwina Cowan and during its first 13 years served over 2,800 clients. The following services are listed among those offered by this agency: study and treatment of persons with such difficulties as poor school work, truancy, antisocial habits, fears, worries, and personal problems. The agency is supported by the Community Fund and offers its services to other agencies in better understanding and planning for their clients. The Wichita Clinic aims to serve primarily normal individuals with normal problems. Applicants with major personality disorders are referred elsewhere.

CHILD WELFARE ORGANIZATIONS

The clinical psychologist in the *child welfare organization* is likely to do more diagnostic work and less treatment than does his professional counterpart in the guidance clinic. The fact is that the welfare agency frequently refers difficult problems to the guidance center for treatment. The welfare psychologist studies the child for the purpose of interpreting his abilities and behavior characteristics to the social worker, parent, and foster parent. Treatment programs are suggested by the psychologist, but the actual carrying out of the treatment is usually done by the parents or foster parents through the direction of the social worker. One of the most important services of the psychologist in the welfare agency is in accurate diagnosis and prognosis of the child's abilities and characteristics when he is offered for adoption. Through this type of service the probability of successful adjustment in adoptions is greatly increased.

The child welfare agency frequently stands in the place of parents, and the psychologist can offer many suggestions that will help in the home adjustment as well as the educational and vocational guidance of the child. Many children who first come under the care of social welfare agencies are disturbed and need various types of therapeutic treatment. The responsibility for the treatment program falls primarily upon the social worker, but the psychologist contributes

Rogers, Carl R., *The Clinical Treatment of the Problem Child*, Houghton Mifflin Company, Boston, 1939.

¹ Carter, Jerry W., Jr., The Wichita Guidance Center, *J. Consult. Psychol.*, 1944, 8, 27-30.

much toward the understanding of the child through the interpretation of his behavior and the measurement of the effects of treatment.

INSTITUTIONS FOR THE MENTALLY DEFICIENT

The psychologist who practices in the *institution for the mentally deficient* has a long historical tradition and well-known predecessors in his field. Among the best known names of psychologists who have practiced in institutions for the mentally deficient are Seguin, Goddard, Huey, Porteus, Kuhlmann, and Doll. Each of these men has made significant contributions to the understanding of the feeble-minded. There are relatively few institutions for the mentally deficient in which significant psychological contributions have been made. Unfortunately many institutional administrators have been satisfied to emphasize their custodial responsibilities. It is in the training institution that the clinical psychologist can make a distinct contribution toward the most effective treatment of the mentally deficient.

Letchworth Village at Thiells, New York, is one of the more progressive institutions for the treatment of the mentally deficient. This institution uses psychological service in its clinical function as well as in training and research. Kinder¹ has described the clinical service at Letchworth Village in terms of three objectives—first, to meet the needs of the institution, second, to furnish clinical material for students in training, and third, the provision of data for research studies. The major load of work is described as the examination of new admissions and presentation of the psychological data to the various departments that are concerned with the child in the institution. The psychiatrist, neurologist, and psychologist make a diagnosis of the patient at the staff consultation clinic. In addition to the clinical work with new admissions, the psychologist continues study with retests to determine the special abilities of particularly the higher grade patients. The information obtained from these studies is pertinent to the general understanding of the child and aids the physician, teacher, and parole staff, who actually carry out the child's training.

The extensive study of the mentally deficient that has been carried on during the past half century has contributed much to the general understanding of children's behavior. Institutions for the mentally deficient have provided excellent settings for research because of the continuity of residence, making possible the study of individuals over long periods of time. Much of the research in these institutions

¹ Kinder, Elaine F., *Psychological Work at Letchworth Village, Thiells, New York, J. Consult. Psychol.*, 1937, 1, 76-80.

has contributed to the basis of information and techniques underlying clinic practice.

PENAL AND CORRECTIONAL INSTITUTIONS

The practice of clinical psychology in *penal* and *correctional institutions* is, according to Corsini,¹ a relatively new field, having grown since the First World War. A recent survey by Marquis² lists 80 psychologists who are members of recognized professional groups employed in correctional institutions, as compared with 362 employed in schools and educational institutions, 202 in guidance centers and clinics, and 183 in hospitals and custodial institutions.

The work of the prison psychologist in some cases has been primarily psychometric; *i.e.*, he collects test data for the records or research. This is a very limited function of the clinical psychologist. The most valuable function of the prison psychologist is his work in personal guidance. If the institution is to become more correctional and less punitive the clinical work of the prison psychologist will increase. Corsini³ points out that the personality and experience background of the prison psychologist is most important because the success of his work depends upon his ability to establish rapport with the prisoners, who may be from sixteen to eighty years of age, of any race, and of any social or economic status.

The prison psychologist works with other members of the professional team to contribute information about the inmate's ability, personality, and aptitudes so that his treatment in the institution will be most effective and his success on parole more probable. Giardini⁴ has been a leader in the parole prediction studies and has shown that it is possible to make relatively accurate predictions of the success of prisoners on parole.

A committee of the American Association for Applied Psychology in 1941 under the chairmanship of Giardini reported a survey⁵ of psychological work in institutions for delinquent boys and girls. Replies to a questionnaire were received from 84 superintendents and 43 psychologists. The replies from the superintendents indicated that every superintendent who had a trained psychologist on his staff

¹ Corsini, Raymond, Functions of the Prison Psychologist, *J. Consult. Psychol.*, 1945, **9**, 101-104.

² Marquis, D., The Mobilization of Psychologists for War Service, *Psychol. Bull.*, 1944, **47**, 469-473.

³ Corsini, *op. cit.*, p. 103.

⁴ Carter, A. C., and Giardini, G. I., Reliability of Psychological Prognosis in Western Penitentiary of Pennsylvania, *J. Crim. Law Criminol.*, 1935, **26**, 556-560.

⁵ Giardini, G. I., Report of the Committee on Psychological Work in Institutions for Delinquent Boys and Girls, *J. Consult. Psychol.*, 1942, **6**, 157-162.

regarded psychological work in the institution as essential and generally expected that the psychologist would contribute more than the results of mental testing. The order of frequency of the services of psychologists listed was (a) to help the administrator understand the inmates, (b) to aid in the treatment of behavior problems, (c) to recommend and aid in training programs, (d) to aid in selection of parolees, and (e) to help train the staff in understanding and handling the inmates. Case reports are given to show how these functions are carried out. These case reports indicate that the primary treatment technique used was that of guidance interviews with directed activities.

HOSPITALS

One of the more recent fields of clinical practice is in *hospitals* of various types. A symposium¹ on the function of psychologists in hospitals is presented by various authors in a recent number of the *Journal of Consulting Psychology*. In the discussions in the symposium there is little mention of any clinical psychology in hospitals previous to 1940. The trend in psychological work in hospitals seems to be toward the use of more clinic service, as opposed to psychological service at the technical level of psychometrics. In the hospital the psychologist works as a member of a professional team particularly in the diagnostic function. In a few instances the psychologists report assignment to treatment work, such as play therapy.² In general, it can be said that the clinical psychologist in the hospital is likely to assume a relative position on the staff in keeping with his training and professional ability. That is to say, if he is prepared to contribute and take part in the functions of the hospital at the professional level his activities will not be confined to the technical level. The emphasis on practice at the professional level in a general hospital is indicated in the division of the hospital psychologist's time recorded by Schott³ as follows: interviewing, 40 per cent, therapy, 30 per cent; testing, 25 per cent; and miscellaneous, 5 per cent, which includes general participation in hospital staff problems.

The outlook for practice of clinical psychology in hospitals is excellent according to Schott.⁴ It is his opinion that every hospital needs psychological service in all its departments. Neuropsychiatric and pediatric hospitals especially are including psychologists in their

¹ Psychologist's Function in Hospitals, *J. Consult. Psychol.*, 1944, 8, 267-322.

² Kinder, Elaine F., Work of the Psychologist in a Psychiatric Unit for Children, *J. Consult. Psychol.*, 1944, 8, 273-280.

³ Schott, Emmett L., The Psychologist in the General Hospital, *J. Consult. Psychol.*, 1944, 8, 302.

⁴ Schott, *ibid.*, p. 306.

staff plans. The future of the psychologists in these plans will depend largely upon the standards of training and the professional status of the people who obtain these positions. It is with this in mind that the writers of every article in the symposium cited above stress the training and internship practice necessary for effective clinical practice.

A recent special number of the *Psychological Bulletin*¹ deals with clinical psychology in the military services. Since Chap. XVII of this book has been devoted entirely to psychology in military affairs, this writer will do no more than call the student's attention to the vast, new field for clinical practice described in the *Bulletin*. The psychologist has contributed much in the programs of selection and adjustment in the various military branches, and in the postwar period there will be extensive need for clinical services in rehabilitation guidance and therapy.

SUMMARY

Clinical practice in psychology is a profession that deals with problems of behavior adjustment. The work of the clinical psychologist involves a combination of art and science. The basis for clinic practice lies in the use of scientifically proved techniques, but the effectiveness of the service rendered to the individual is dependent upon the experience and judgment of the clinician. Professional practice entails a cooperative relationship with other professional fields, such as psychiatry, medicine, education, and social work.

The training necessary for practice in clinical psychology consists of basic courses in psychology and the techniques of applied psychology. Internship under supervision is particularly important and is requisite to state certification for clinical practice in public schools.

The diagnostic methods in clinic practice are interviews and standardized psychometric tests. These techniques are used to obtain the individual's developmental history, present environmental status, and the status of his mental development, personality, aptitudes, interests, and abilities. The professional services of physicians, educators, and social workers are enlisted to obtain information in their respective fields. Treatment techniques vary with the behavior problem at hand and usually involve the cooperation of parents, teachers, and others who may assist in carrying out a planned program.

The most extensive area of clinic practice in psychology at present involves the child's behavior in school, although psychological service is available to less than 10 per cent of American school children. The adjustment problems considered by the school psychologist are related

¹ Sears, Robert R. (Ed., special number), *Clinical Psychology in the Military Services*, *Psychol. Bull.*, 1944, Vol. 41, No. 8.

to mental or physical handicaps, mental superiority, behavior maladjustment, school-subject disabilities, and guidance. Clinical practice in schools also deals with the direction of behavior for the purpose of preventing maladjustment. The psychologist works with others in planning educational procedures to improve mental hygiene in education.

Clinical psychologists are employed in child guidance clinics, child-welfare agencies, hospitals, and institutions. Professional practice in these organizations involves cooperation with psychiatrists, physicians, and social workers in the diagnostic and treatment program. The role of the psychologist in institutional work has usually emphasized diagnostic practice more than treatment. The tendency to extend the treatment phase of clinical practice is evident in recent literature describing psychological practice in institutions. This is particularly true in relation to the work of the psychologists in veterans' rehabilitation programs.

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